Logistics Management Institute

Use of Information Technology for Management of U.S. Postal Service Facilities

PS505MR1

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EXECUTIVE SUMMARY

Ensuring that the U.S. Postal Service (USPS) has the right facilities at the right time and at the right price is a huge and complex job. In any one year, the USPS Facilities organization may acquire more than 100 sites, plan hundreds of new construction and renovation projects, solicit qualifications and price information, and award millions of dollars worth of design and construction contracts. In addition, it must manage work in progress—tracking project schedules and budgets, authorizing contract payments, and ensuring project quality, among other tasks— on construction and renovation projects initiated over several years. Finally, it must manage more than 27,000 leases. In all, the Facilities workload encompasses nearly 70 different tasks, or business processes. Each involves many steps—preparation of forms, letters, and contract agreements; analysis of data; preparation of reports; etc.—and several different elements within the Facilities organization, other USPS organizations, and private-sector companies.

To accomplish all of its tasks, the Facilities organization both uses and generates a great deal of information—about each project as well as about the entire inventory of some 35,000 USPS facilities, both owned and leased. The need to manage that information effectively led to the development of the Facilities Management System (FMS). Over the 23 years since it was implemented, the FMS has been continually modified to accommodate expanding information requirements. The most recent modification occurred in late 1995, when the Facilities organization converted the FMS to a Microsoft Windows-based environment.

Despite the improvements, the FMS can be considered adequate at best. It tries to be all things to all people, but it does not appear to do many things well. Questions remain about the usefulness of some revisions embedded in the system architecture, the ability to extract data easily, the quality of the data, and the applicability of the system to current business practices, among other concerns.

Because of the magnitude and complexity of its workload, and the increasingly lean Facilities organization, managers and staff must have management tools to streamline and simplify their tasks. The Facilities organization should develop

templates linked to a database for commonly used forms and letters, require contractors to submit updated progress schedules and payment requisitions electronically, implement videoconferencing capability, implement the use of electronic time sheets to provide data for measuring workload and productivity, enhance the staff's ability to access the information system while out of the office, develop an Internet site for the Facilities library of standards and references, and review data elements maintained in the database for their value and accuracy, among other actions. All of these near-term enhancements can be accomplished in less than a year at a relatively low cost and will improve productivity.

In the longer term, the Facilities organization should design a new management system to take full advantage of advances in information technology. Exactly which information technologies will best meet USPS needs is difficult to predict, because computer and telecommunications technologies are advancing so rapidly. However, among those that should be investigated for their potential application to Facilities tasks are dataconferencing and videoconferencing; asynchronous transfer mode, which can carry voice, data, and video traffic simultaneously; distributed application architectures and distributed relational databases, both of which increase speed and reliability; and massive parallel processing, which can be used to obtain answers quickly when large quantities of data are maintained, complex calculations are required, or a large number of users access the system simultaneously. These and other technologies should be fully developed within 5 to 10 years and will bring dramatic change to today's office business practices.

So that it will be able to apply future technologies effectively, the Facilities organization should immediately initiate a number of actions, such as the following:

- ◆ Review all Facilities business processes with an eye toward streamlining and simplifying them as well as integrating electronic technology to the maximum extent possible

- ◆ Prepare a multiyear business plan that frames the Facilities objectives, defines business principles, and provides a road map for the integration of information technologies into Facilities business processes

- ◆ Evaluate commercial off-the-shelf software packages to identify those that could be used to simplify and streamline Facilities tasks

- ◆ Implement electronic data interchange technology, including electronic funds transfer, where possible

- ◆ Initiate a program for storing and retrieving contract and other documents electronically.

By implementing these and other, similar actions, Facilities will be well positioned to integrate the future technologies that will enable it to conduct its business as efficiently and cost-effectively as possible, as well as to make continual improvements in its business practices.

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Chapter 1
INTRODUCTION

The U.S. Postal Service (USPS) occupies approximately 35,000 individual facilities containing more than 255 million square feet of interior space. The facilities vary widely in function and size—from a small customer-service facility, such as a Postal Express outlet or a 500-square-foot storefront in a shopping mall, to a million-square-foot state-of-the-art processing and distribution center. The USPS owns about 25 percent of those facilities, or about 70 percent of the total square footage, and leases the remainder.

Ensuring that the USPS has the right facilities at the right time and at the right price is the responsibility of the USPS Facilities organization. That organization has two core functions: design and construction and real estate. The design and construction staff is responsible for building and renovating USPS facilities, and the real estate staff is principally responsible for acquiring land needed for new facilities and for managing facility leases.

The workload faced by the Facilities organization is huge. In FY96, for example, the design and construction staff has a capital budget of $1.28 billion. The staff must plan each new construction and repair and alteration (R&A) project, solicit qualifications and price information, and award contracts, as well as manage project schedules and budgets, authorize contract payments, and ensure project quality, among other tasks. In any one year, the design and construction staff may award hundreds of contracts and manage work in progress on new construction and R&A projects initiated over several years. Similarly, the real estate staff may acquire more than 100 sites, complete more than 6,000 real estate transactions, and manage more than 27,000 leases. In all, the Facilities workload encompasses nearly 70 different tasks, or business processes (see Appendix A).

Each of the tasks done by the Facilities organization involves many steps—preparation of forms, letters, and contract agreements; analysis of data; preparation of reports; etc. Each process also may involve several different elements within the Facilities organization; other USPS organizations, notably, finance and accounting; and elements outside of USPS, such as architect-engineers (A-Es) and construction contractors. Moreover, many of the Facilities processes are interrelated; for example, information generated in the contracting process is needed by the project manager to ensure that the contractor meets the terms of the contract and by the finance staff to determine payment amounts.

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To accomplish all of its design and construction and its real estate activities, the Facilities organization both uses and generates a great deal of information—about each project as well as about the entire inventory of USPS facilities, both owned and leased. The need to effectively manage, share, and keep current the large amount of data pertaining to USPS facilities led to the creation and implementation of the Facilities Management System (FMS). The FMS now serves as the main repository for all the descriptive, management, and financial information pertaining to any property over which the USPS has some form of management responsibility.

As the primary source of information about the USPS facility inventory and facility-related projects, the FMS is used daily at all levels of the USPS and the Facilities organization—headquarters, the Major Facilities Office (MFO), 10 Facility Service Offices (FSOs), 10 area offices, and 85 district offices—to carry out their responsibilities:

- ♦ *Headquarters.* Facilities personnel at headquarters are responsible primarily for administering all operations of the Facilities organization; they also work with the USPS finance staff to establish the overall Facilities budget.

- ♦ *MFO and FSOs.* The MFO is responsible for design and construction of processing and distribution facilities. The FSOs are responsible for the customer-service facilities in their respective regions; those responsibilities include design and construction of all new facilities and R&A projects costing more than $250,000, as well as all leasing activity.

- ♦ *Area and district offices.* Area and district offices manage design and construction projects costing less than $250,000.

Initially developed more than 20 years ago as a tool for maintaining financial information about USPS real property, the FMS has been continually modified to take advantage of advances in electronic technology, as well as to improve Facilities business practices and accommodate expanding information requirements. The most recent modification occurred in late 1995, when the Facilities organization converted the FMS to a Microsoft Windows-based environment, making it easier to use. The system's current configuration, FMSWIN, provides users with on-line data access, updating capabilities, and the ability to generate reports (including those mandated by federal law).

Notwithstanding the many improvements made to the FMS, questions remain about the usefulness of some prior revisions embedded in the system architecture, the ability to extract data easily, the quality of the data, and the applicability of the system to current business practices, among other concerns. Because of the magnitude and complexity of its workload, and the increasingly lean Facilities organization, it is critical that the staff has management tools to streamline and simplify its tasks; the Facilities organization must be able to conduct its business as effi-

ciently and cost-effectively as possible. Thus, the Postal Service tasked the Logistics Management Institute to assess the ability of the FMS to support organizational needs, both now and for the next several years, as well as to define long-term system requirements and to assess the appropriate use of information technology to enhance Facilities management, project execution, and resource planning capabilities.

Study Approach

The Institute's approach to assessing the appropriate use of information technology to support the needs of the USPS Facilities organization contained three elements: conduct internal and external interviews, review FMS documentation and performance, and review industry practices and technological advances.

During the course of this task, we interviewed individuals that work at various management and staff positions within the Facilities organization as well as other organizations within USPS. We were assisted by a USPS Support Team comprising Facilities field office personnel from around the country. Each of the primary job positions within the Facilities offices was represented on the team. The Support Team met for two days to review our initial findings and has continued to provide information to the Institute. Appendix B lists the individuals we interviewed and the Support Team members.

In addition to conducting interviews, we reviewed FMS documentation and participated in a training session for FMSWIN. We also observed various field office personnel while they performed their daily work responsibilities. Finally, we reviewed the materials they produce as a routine part of their jobs and the processes they must go through in order to execute tasks. (Appendix C lists the materials that we reviewed.) We used the information we obtained as the basis for defining the Facilities information system requirements.

The Institute looked at how other companies with national responsibilities manage their facility functions and reviewed the extent to which they use information technology. Our objective was to see how they might apply to USPS Facilities requirements. We also looked at commercial off-the-shelf (COTS) software for potential application to USPS requirements (see Appendix D).

One constraint associated with our study concerns its timing. Specifically, the system was undergoing a major transition from its original mainframe-based platform using WANG hardware and software configured with a distributed database to a client–server system with a central database using an Amdahl/MVS mainframe with Oracle software and accessed by PCs with a Windows operating system. Thus, some of our observations may concern functional capabilities that have since been changed.

Report Organization

This report conveys our findings, conclusions, and recommendations. In Chapter 2, we summarize the evolution of the FMS and describe the current FMS architecture, and in Chapter 3, we describe the primary users of the FMS then discuss what they need in the FMS to work as efficiently and cost-effectively as possible. We present our assessment of the performance of the FMS—both the architecture and the user interface—in Chapter 4. Finally, in Chapter 5, we present our recommendations both for the near term as well as for the longer term. Appendices provide details.

Chapter 2
DESCRIPTION OF FACILITIES MANAGEMENT SYSTEM

The FMS comprises a network structure, hardware, and software that provide access to detailed information about USPS owned and leased facilities and about ongoing design and construction projects. Originally designed as a text-based mainframe application, it recently was redesigned to take advantage of Microsoft Windows, an easy-to-use graphical user interface. We describe the current system architecture in this chapter. However, because it is important to our understanding of the system as it exists today, we first summarize the evolution of the FMS.

System Evolution

The USPS implemented the FMS in June 1973 in response to a need for accurate records on capital expenditures for real property. The system was implemented on an IBM 370-155 computer located at the Postal Data Center (PDC) in St. Louis, Missouri, and the database—named the FMSR or national database—was established on a database management system (DBMS) hosted by the National Military Command System Support Center Information Processing System (NIPS). The USPS later developed two modules to the FMS: Project Authorization and Control System (PACS) to track project funding and the Rent/Lease System to document information on rents and leases and to automate rent payments. Both PACS and the Rent/Lease System were established on CICS/VSAM databases.

Users accessed the FMS databases via terminals located at headquarters and at each Contracting and Support Office. For standard reports, users retrieved information by running one of the standard programs. However, for ad hoc reports, customized programs had to be written; users submitted their request for a customized program to the Information Systems Service Center (ISSC) in St. Louis.

To add or modify information in the databases, field personnel prepared the appropriate data input form for each facility or project—for example, Form 7500 for the FMSR, Form 4209 for PACS, or Form 125 for the Rent/Lease System. They then mailed the forms to the St. Louis PDC, where data-entry personnel keyed the information for input, as a batch transaction, into the appropriate database. Key information in the PACS and the Rent/Lease System was transferred to the national database.

In the late 1980s, the USPS initiated an effort to add a local component to the FMS so that users would have direct, on-line capability to access data, update information in the FMS, and generate reports. The new component, designed for use with a Wang VS computer, evolved to become FMS+. FMS+ replicated all of the information carried on the FMS plus provided additional information—site and building characteristics, project scheduling, financial information, comments, etc.—to assist in local project management. Specifically, the FMS+ program, written by PSI Systems, Inc. (PSI), was designed to provide a local database, provide current project information at each office, streamline the updating process (by enabling project managers to input the FMS databases directly from their own Wang minicomputers), and provide a facility/project data core that could be used to streamline other local transactions such as lease actions and indefinite quantity contracts (IQCs). That effort included the development of highly specialized applications, such as the Real Estate Contracting System (RECS) and, later, the Design and Construction Contracting System (DCCS)—both modules to generate contracts—and the Underground Storage Tank System. While implementing the Wang-based FMS+ for local users, the USPS also moved the FMSR, PACS, and the Rent/Lease System databases to the USPS PDC in San Mateo, California.

In March 1994, the FMSR was moved from the NIPS DBMS to a DB2 DBMS, which increased users' data accessibility as well as provided more functionality to the system. Users continued to access the information contained in the FMS either through Wang dumb terminals or through PCs connected to the database using a terminal emulator. However, the system was not user friendly. For example, data contained within the system were often stored as one-character codes or were abbreviated, which had little meaning to those unfamiliar with the field codes or the abbreviations. In addition, the FMS did not offer an easy way to enter or retrieve information from other applications, such as spreadsheets used by management to display information in formats not contained in the reports offered by the FMS. Management and users alike also developed requirements for additional uses of the information contained within the FMS. Finally, the terminal-based system was inconsistent with USPS office standards such as Word for Windows and Excel.

In an attempt to make the FMS easier to use, PSI developed a graphical user interface designed to run on IBM-compatible machines under the Windows 3.1 operating system. The development included upgrading the system to a client–server model using the Postal Routed Network (PRN) and the existing TCP/IP communication lines. The upgrade involved the development of the client front end in Powerbuilder and the migration of the local databases at each FSO and MFO to a single Oracle DBMS. The new system, called FMSWIN, was implemented in November 1995.

The new Windows-based system offers pull-down menus, drop-down list boxes, tab-based folderlike windows, and other Windows-specific controls that allow data to be displayed in an easy-to-read interface. In addition, the Windows system

allows multitasking, so users can run multiple programs at the same time. For instance, users can have a spreadsheet open at the same time that FMSWIN is loaded and thus can easily copy information from FMSWIN into their report spreadsheets with a few keystrokes, eliminating data reentry.

While the new system is more user friendly and eliminated a great deal of rekeying, users have experienced inconsistent transaction times and some performance problems. PSI and the ISSC are working together to solve the performance problems associated with FMSWIN. Through their efforts, FMSWIN is starting to show promise as an effective management tool.

Current System Architecture

NETWORK STRUCTURE

Network services are provided by the PRN, which ties headquarters with other Facilities offices, such as the MFO, FSOs, area offices, and district offices, in a wide area network (WAN). The PRN also provides local area network (LAN) support to each office. The Facilities organization relies on the PRN for all of the data communication that occurs between the FMSWIN client machines and the Oracle/DB2 databases. E-mail distribution and Internet access is provided over this network as well. A network topology map is displayed in Figure 2-1.

Each LAN—at headquarters, the MFO, and the 10 FSOs—is administered by a NetFrame NF 450 server running Novell Version 3.12 or 4.11 LAN software. The server routes packets of information through the LAN using the standard Novell IPX/SPX protocol. The Netframe server at headquarters is configured with 128 MB of RAM and 20 GB of hard-drive space. The servers at other Facilities offices, which have fewer users than headquarters has, are configured with 64 MB of RAM and 8 GB of hard-drive storage space. In addition to the NetFrame server that handles packet routing requests, each LAN also has a Pentium-based application server that is used as additional network storage space. This server is not currently used to serve applications to users.
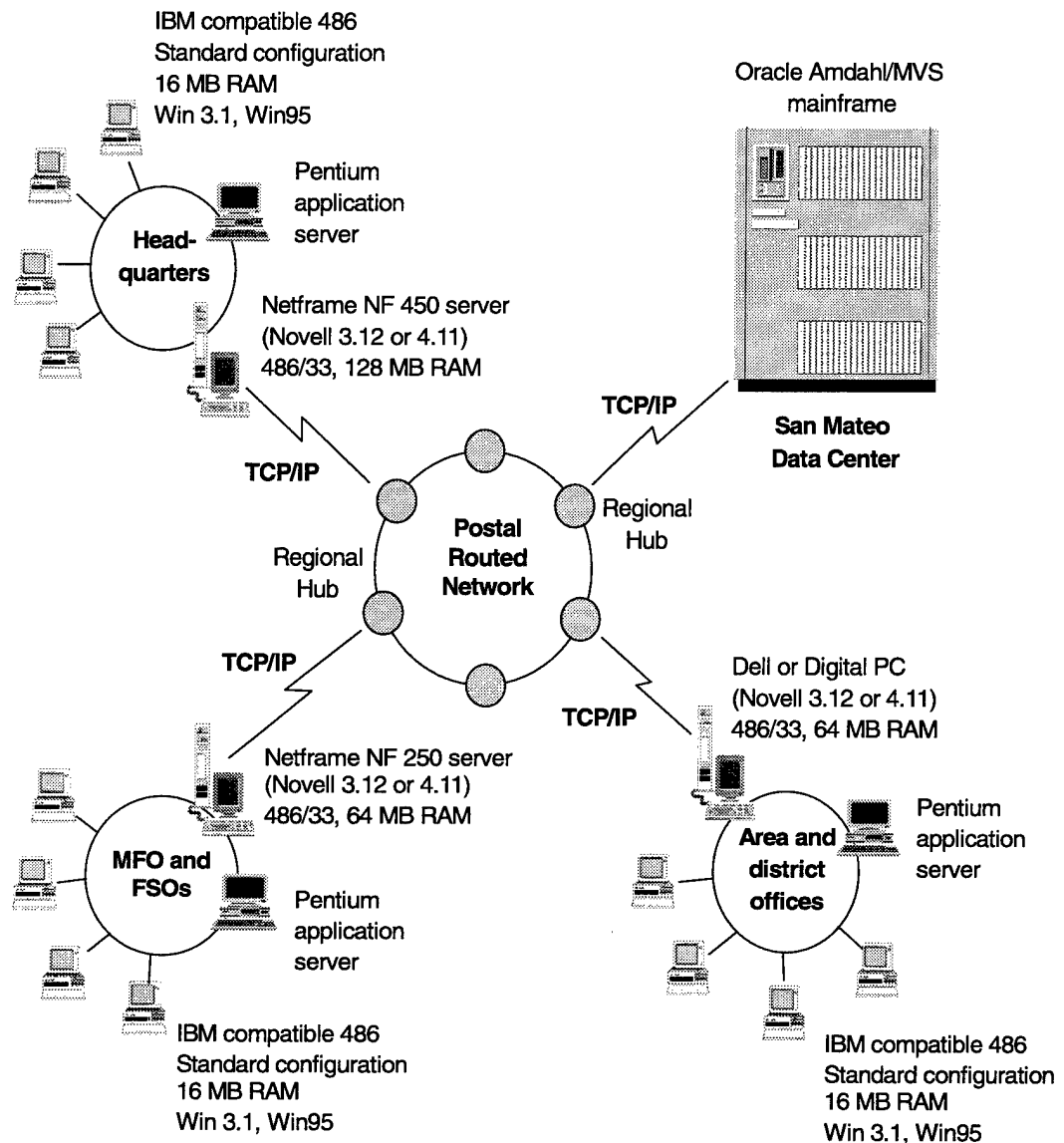
Figure 2-1. FMS Network Topology

If the destination of the information packet is outside of the LAN (elsewhere on the PRN, such as another FSO), the TCP/IP protocol is used rather than IPX to send information over the PRN. The packets are passed from one destination to another by a three-tiered series of routers grouped in a hierarchical fashion. At the top level of this hierarchy (Tier 1) are 15 Wellfleet BCN superrouters, which are dispersed, at approximately equal distances, throughout the nation. The second tier of this network is composed of about 85 to 100 Wellfleet LN routers, which are located primarily in the district offices. Most of the packet transfers associated with the FMS pass through this second tier. The third tier of this network is composed of 200 low-level routers located in remote post offices.

HARDWARE

FMSWIN was designed using available client–server technology. Figure 2-2 shows how the two discrete units work together. The first of these units is the client front-end application, which is installed on every user's computer. The user interacts with data directly on the front-end application by editing data on-screen, running reports, and creating new project or facility records to be stored on the database. The front-end application then sends changes or requests to the server to be processed and physically stored in the database.

Client application
Runs on IBM-
compatible machines
Typical configuration:
Intel 80x86 or Compatible
16 MB RAM

•Client requests project or facility
  data from server
•Client sends new project or facility
  data to be stored

•Server sends requested project or
  facility data back to client
•Server commits new data from
  client into database

Server database
IBM 370 plug compatible
mainframe

Figure 2-2. FMS Client–Server Model

Client Side

The standard Facilities workstation platform is based on the Intel 80x86 CPU. The majority of the Facilities platforms are of the 80486 generation. Each PC was installed with 16 MB of RAM, a 1.44 MB 3.5" floppy-disk drive, a VGA color monitor, and 120 MB IDE hard disk. See Appendix E for a list of typical system hardware in the offices.

Facilities is in the process of replacing all 486 desktop machines with Pentium laptops that have 16 MB of RAM because the IBM 486 processor is inadequate to run FMSWIN optimally. The Pentium laptop should improve performance because its CPU is faster.

Server Side

The structure of the server side of the FMS is depicted in Figure 2-3. As currently structured, the four database components contain the following information:

♦ Local database, commonly referred to as the FMSWIN database, contains facility inventory data as well as some project information and provides user access to the FMSR, PACS, and the Rent/Lease System.

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◆ FMSR, or national database, contains information about all of the facilities owned or leased by the USPS as well as about all current projects.

◆ PACS is a legacy database that keeps track of all project funding.

◆ Rent/Lease System keeps track of all leases.
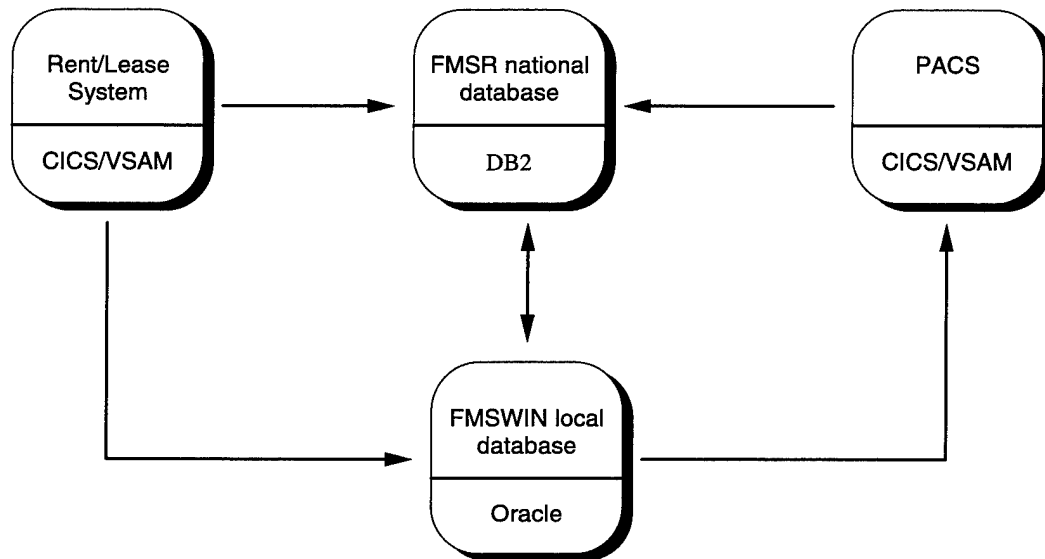
Figure 2-3. Structure of FMS Database

The data accessed through the FMSWIN front end reside in the Oracle FMSWIN database running on an MVS mainframe located at the San Mateo PDC. The FMSR, a DB2 database, is maintained on an IBM mainframe. The local component is connected to the mainframe running FMSR by a network integration package known as SQLNet. The server hosting the local portion of the database is an MVS server consisting of six parallel processors.

PACS is located on an IBM mainframe running CICS/VSAM. All document generation as well as project authorizations, commitments, payments, and closeouts are entered through the FMSWIN front end and are uploaded via database triggers into PACS daily. Database procedures handle all data crossovers back into the FMSR database.

Like PACS, the Rent/Lease System is hosted on an IBM mainframe running a CICS/VSAM database. Lease contracts and tax and liability payments are transferred to the FMSR database via software procedures residing on the mainframe; project closeout data are transferred from the FMSWIN database in a like manner.

SOFTWARE APPLICATIONS

For most of its business applications, the Facilities organization uses the Microsoft Office Suite, which has been highly praised for its ability to share data easily

across the different suite packages. The specific packages used by Facilities staff include the following:

♦ *Operating system.* Currently using Windows 3.1 in a DOS environment. The Facilities organization is upgrading their Windows 3.1 machines to Windows 95, which offers better memory management and performance than Windows 3.1.

♦ *Spreadsheet analysis.* Currently using Microsoft Excel for Windows as the standard spreadsheet application. Excel has an easy-to-use graphical interface that allows users to cut and paste with a few keystrokes, enabling easy exchanges of data with other Microsoft applications. Facilities staff use Excel primarily to prepare the final version of various reports. Some FSOs also use Excel to track project status and schedules.

♦ *Word processing.* Currently using Microsoft Word for Windows as the standard word processor. Word allows the use of boilerplates for easy modification of various solicitations and other business correspondence. Each office has a different set of document boilerplates that are saved on the office network for use by the contracting and real estate specialists.

♦ *Presentation graphics.* Currently using Microsoft PowerPoint as the standard graphics presentation package for creation of high-quality transparencies, 35mm slides, and handouts. Graphics created in PowerPoint can be easily embedded directly into Word or Excel documents and modified from within those other applications.

♦ *Project scheduling.* Some project managers are currently using Microsoft Project for their project management needs. Although the FMS offers a form of scheduling within FMSWIN, many project leaders find that the ability of Microsoft Project to create links between parallel tasks (tasks performed concurrently) or subsequent tasks (one task cannot begin until a prior task is completed) to be useful. It should be noted that Microsoft Project is not a Facilities standard. Some project managers find it easier or more efficient to monitor project status through Excel.

♦ *Electronic mail.* All offices are using cc:Mail to distribute correspondence throughout USPS; cc:Mail also can be used to send mail through the Internet.

♦ *Telecommunications.* The Facilities standard software for remote access to the FMS is NetBlazer, which combines the FMSWIN front-end software with OnNet remote access software and an Oracle database. Some offices use PCAnywhere to provide remote access to the office LAN for retrieving electronic mail and sharing files in addition to FMSWIN access.

♦ *Forms management.* FormsFill is the USPS standard software for common forms such as leave requests, expense vouchers, etc.

♦ *Generation of envelopes and labels.* Envelope Manager and Dazzle are used by contracting and real estate personnel to automate much of the envelope and label generation for office correspondence.

♦ *Computer-aided design/computer-aided manufacturing (CAD/CAM).* Facilities has recently made a move to upgrade CAD/CAM workstations in each of the FSOs. These workstations will be used to create, modify, and transmit building designs and specifications, as well as to archive standards and individual projects.

Some offices are experimenting with other software packages for specialty purposes, including the following:

♦ Monitoring appraisal values of real estate (Marshall-Swift Cost Estimating)

♦ Mapping and analyzing area trends (MapInfo)

♦ Improving task management (electronic time sheets)

♦ Accessing the Internet (Netscape).

Chapter 3
FACILITIES MANAGEMENT SYSTEM USERS AND THEIR REQUIREMENTS

Elements at all levels of the Facilities organization use the FMS daily to conduct business. In this chapter, we briefly describe the primary users of the FMS—including their functions and how they use the FMS in their work. We then discuss the reports and information that the system should be able to generate to enable the Facilities organization to conduct its business as efficiently and cost-effectively as possible.

System Users

Nearly 1,100 people use the FMS in their day-to-day activities, and an estimated 250 to 300 users may be on line at any one time. Users include individuals in the Facilities organization as well as those involved in finance at the area and district offices. Table 3-1 shows the number of potential users in each organizational element. The following subsections outline how the staff in each element uses the FMS.

Table 3-1. Potential Users by Organizational Element

Location	Number of sites	Number of potential users
Primary users		
Headquarters	1	150
Major Facilities Office	1	36
Facility Service Offices	10	414
Area maintenance support units	10	70
District administrative services offices	85	255
Other users		
Area finance offices	10	20
District finance offices	85	170
Total	202	1,115

HEADQUARTERS

Personnel at headquarters are primarily responsible for the administration of all operations of the Facilities organization. In addition, they work with finance to establish the overall budget for facilities. The following are the primary users at headquarters:

- *Project manager.* Involved in establishing the standards and guidelines for Facilities. Uses the FMS to monitor project status, approvals, commitments, and schedules. May produce, in Excel, project management reports that use FMSWIN data.

- *Facilities program analyst.* Involved with the budgeting and planning of major facilities. Uses the FMS to look up project schedules and to check on the funding of projects.

- *Program specialists.* Program and run report queries for custom reports and provide support to FMS users.

- *Real estate specialist.* Uses the FMS to generate sales or lease documents in RECS. Also authorizes funds and generates 4209 forms.

- *Fixed asset accounting specialist.* Uses the FMS to track active facilities, capital interest, and leasehold improvements. Most of the information used comes directly from PACS.

- *Contracting officer.* Utilizes the FMS for contract generation and management.

- *Budget and planning staff.* Responsible for capital and program evaluation and for development of the Facilities five-year plan. Most of the information used is taken from the Budget Planning System, which is indirectly tied to the FMS.

- *Inspector.* Accesses FMS data, primarily PACS, to audit and monitor project funding status.

- *Environmental staff.* Uses building inventory data to formulate and monitor environmental building initiatives. Uses associated systems, such as the Underground Storage Tank System and the Boiler/Elevator Management System, which link with facility inventory data from FMSWIN.

MAJOR FACILITIES OFFICE AND FACILITY SERVICE OFFICES

The MFO deals primarily with design and construction of new processing and distribution facilities, while the 10 FSOs are responsible for all new construction relating to the customer-service facilities plus all R&A projects costing more than $250,000 and all leasing activity for their specific region. The personnel positions at the MFO and FSOs are similar. The main users of the FMS in those offices include the following:

♦ *Office manager (1 per office).* Prepares various management reports (staff workload, project status, capital facility projects, five-year plan, etc.) using FMS data. Approves some payments and commitments in the FMS.

♦ *Design and construction project manager (7 to 15 per office).* Uses the FMS data to update and monitor project schedules either in Microsoft Project or Microsoft Excel. Generates workload analysis reports in Excel using project data from FMSWIN. May also generate other Word reports that contain FMS data. Uses data in the FMS (PACS) to monitor approvals and verification of funding.

♦ *Real estate specialist (5 to 16 per office).* Uses the FMS (RECS) to generate contract documents for leasing and purchasing real property.

♦ *Facilities contract technician (FCT)/facilities contract specialist (2 to 6 per office).* Is the power user of the FMS. Performs most of the data entry for project payments and commitments as well as lease administration.

♦ *Postal operations analyst (1 or 2 per office).* Uses the FMS to approve 4209 forms and to look at existing facility inventory data. Reviews new construction projects (owned and leased) in the planning phases.

♦ *Purchasing specialist (1 or 2 per office).* Uses the FMS to aid property acquisition and contracts. Creates contracts and solicitations through FMSWIN.

♦ *Information systems coordinator (ISC) (1 per office).* Is the primary technical representative for the FMS at each office and main liaison with the ISSC. Performs much of the system administration at the office level and resolves system problems identified by users.

AREA AND DISTRICT OFFICES

Area and district offices administer projects costing less than $250,000. Users of the FMS within the area and district offices can be broken into two groups:

♦ Users in design and construction who rely on the FMS to provide them with access to the IQCs established by the FSOs. Their primary use of the FMS is to issue current task orders within the context of an IQC.

♦ Finance-oriented users who must monitor current project financial status or administer the facilities budget. They use PACS to track information about the current dollars appropriated and spent for various design and construction projects managed by the offices.

User Requirements

The information system used by the Facilities organization should meet certain overall requirements; specifically, it must support the objectives of USPS management, and it must have certain basic functional attributes. In addition, the Facilities information system must effectively support individual users in their daily work on the many tasks associated with the Facilities program.

OVERALL REQUIREMENTS

Objectives

The Facilities information system must support four primary USPS objectives:

♦ Provide outstanding customer service

♦ Promote sound business and investment practices

♦ Monitor performance

♦ Have the respect of peers as "the best in the business."

To improve customer satisfaction with Postal Service operations, the USPS recently implemented its "Customer Perfect" business strategy. Business practices that improve customer satisfaction are emphasized while those that hinder satisfaction are being changed or eliminated. In its approach to satisfying the Customer Perfect strategy, the Facilities organization is focusing on ways to complete projects faster, improve quality, and reduce life-cycle costs. For example, it is increasing its use of standard designs, increasing its use of national purchasing, and developing improved delivery mechanisms to reduce throughput times.

The Facilities organization is focusing its efforts to promote sound business and investment practices in two key areas:

♦ *Ensuring easy access to information.* The management information system used by the Facilities organization must provide senior management with direct access to information at any time, whether a standard report or a custom report, and without having to send data calls to the field offices. With direct access to information, senior managers will have current knowledge of production, costs, and trends, enabling them to plan and manage the Facilities program. In addition to having easy access to the information, managers also should be easily able to print the information in

an attractive format using a variety of graphics (bar charts, pie charts, curves, etc.) and tables.

♦ *Streamlining routine tasks.* The Facilities information system must enable the staff to perform routine tasks efficiently and effectively. Task performance should be enhanced by the information system rather than impeded by it. That is, the system must support the users rather than vice versa. For example, if it takes longer to complete a task using an information system than it would if done by hand, then the system must be considered a liability and streamlined to increase personnel productivity. The system also must be considered a liability if the staff must spend inordinate amounts of time entering or retrieving data. Rather than being a burden, the information system should be designed to free personnel to perform other aspects of their jobs in a timely basis, such as interacting with various vendors, architects, and construction/leasing personnel.

Performance must be monitored, and benchmarks established, because the business environment within which Facilities must work is constantly evolving. To remain competitive in the industry and to continually strive to be better, turnaround times for project completion must be continually improved. Additionally, all aspects of project costs must be monitored and lowered in order to maximize financial performance. By monitoring performance, management will be able to identify areas of weakness and then to recommend improvements. The critical understanding for the database inquiry capability is that you "don't want to measure for measurements sake, but you do want to measure for useful information."[1]

The information system must provide the ability to track project throughput rates and completion costs and to report this information to management clearly and concisely. An effective benchmarking tool allows management to gain experience from lessons learned. It is not uncommon for businesses to compare operations across regional areas to highlight the "high performers" in a given business area. The approach used by these high performers is often used as the model by which other regions subsequently conduct their own business. This same idea should be applied to Facilities as well. An FSO that is highly competent in a specific business area should be used as the operating business model for other FSOs.

The productivity of the Facilities organization consistently surpasses that of various facilities groups within government and private industry.[2] To maintain this edge, the Facilities information system must provide a wide range of performance benchmarking reports that will enable management to monitor and upgrade operations continually. As FSOs strive to become the best in the business, they must continually streamline their operations. As each FSO increases its own pro-

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[1] Steven Herrera, Manager of Facilities, Ritz-Carlton Hotels.

[2] LMI Report PS406MR2, *Facilities Staffing Requirements at the U.S. Postal Service,* John Cable, Marguerite Moss, and Adam Dooley, April 1995.

ductivity by adopting the best business approaches of the high performers, the total productivity of the entire Facilities organization will increase as a result.

System Attributes

Each of the many users of the information system will have different system requirements based on the functions they must perform. However, to fully support the needs of the staff, the system must have certain basic attributes. Specifically, it must be reliable, be responsive, produce current accurate data, be easy to use, and provide flexible reporting capability.

RELIABILITY

Reliability is perhaps the single most important characteristic of an effective information system. Every minute of system downtime costs the Facilities organization hundreds of dollars in lost productivity. Although it is unrealistic to expect a completely trouble-free system, one should expect that downtime will be minimal and that adequate backup will be available.

RESPONSIVENESS

Every minute that a user has to wait for a screen to perform a given task is a minute that could have been spent by that user doing something else. Additionally, a sluggish system can instill a sense of hostility in the user, causing frustration with the current system.

Although it is difficult to say precisely how fast a system should respond to a user's actions, some common guidelines should be established. Users should be made aware of time-intensive tasks such as complex database queries or database updates. Onscreen progress reports and time estimates should be given for each task. If the users are informed of required processing time, they can better apply their time toward other tasks. In general, a system's responsiveness is determined by a user's expectations. Typically, users will accept the following system performance parameters:

♦ *User interface.* Screen updates should take less than five seconds to occur. The system should notify the user when database tasks will be time intensive.

♦ *Database queries.* How long a system takes to respond to a query depends on the database construction and layout. Generally, responses to complex queries should take no longer than three minutes, and those for routine queries should take less than a minute.

♦ *Reporting.* Most reports are based on information retrieved from the database by queries. Generally, it takes longer to complete a report than it

does to retrieve the supporting information. Acceptable limits for report generation should typically be the time required for the supporting query plus 30 seconds.

DATA QUALITY AND TIMELINESS

To make effective decisions, managers must have accurate and timely information. The data contained within the information system must instill a high degree of confidence in the user. If management is not confident in the accuracy of the information, it cannot be confident in the decisions made based upon that information. Ideally, in the Facilities organization, data should be made available to all users within 24 hours of posting. PACS and Rent/Lease System downloads to FMSWIN now are made every evening and support this presumption. Additionally, each FSO must take responsibility for ensuring that all data entered into the information system are accurate.

USER FRIENDLINESS

An information system should be easy to use. Moreover, users should be able to use the system effectively without extensive training.

Information contained within an information system should be easy to access. The user interface should be intuitive, informative, and easy to navigate. Menus should not be so convoluted as to get the user easily lost. Buttons, list boxes, and other Windows-type controls should be easy to understand and follow.

The data should be easy to export to another application. A cut-and-paste functionality should be present to allow the user to transfer data easily to a word processing, spreadsheet, or other application as needed. That capability will allow users to easily develop various reports that cannot be generated readily in the information system.

Data entry should be a one-step affair with minimal need for double data entry. Approvals, commitments, payments, and relevant information should be transferred electronically to the St. Louis PDC rather than through the mail and should be available directly on line. Users in the field should have ready access to data through telecommunications.

REPORTING FLEXIBILITY

An information system is designed to assist management in making the critical business decisions required to effectively bring about success for the enterprise. To accomplish this, the information system must be able to return information in a form easily accessible and understandable. Users must be able to generate accurate reports with minimal work. The reports generated from an information sys-

tem may be standardized in a fixed format or may be a user-designed ad hoc report.

Fixed reports are accessible from within the application, and their creation requires minimal effort by the user. These reports usually contain the information that management considers to be most pertinent to the daily operations of the Facilities organization. An example of a fixed-format report is the *Expiring Lease Report*, which displays all expiring leases within a user-defined geographic territory and time frame.

User-designed, or ad hoc, reports are generally unstructured and are generated on a need-to-know basis. Whereas fixed-format reports are commonly required on a periodic basis, ad hoc reports are not. Ad hoc reports contain information that is not used extensively to make common business decisions; rather, they contain information that must be used to fill an information gap (e.g., how many facilities have roofs that need replacing). In the past, generating ad hoc reports has been problematic for novice users because of the complexities associated with accessing the database to retrieve needed information.

FMSWIN has made both types of reports available. The FMSWIN front end allows users to run a number of fixed reports; users simply select the report they need from a list of the available fixed reports in the system. For ad hoc reports, users make their data requests from the database using English Wizard, a product designed to translate English-like queries into SQL code that can be passed directly to the database.

OTHER ATTRIBUTES

Other attributes that would enhance the Facilities information system include the following:

♦ *Enable automatic routing and electronic data interchange.* EDI has gained popularity and is increasingly being used in business. Lack of security and accountability have been limiting factors to the widespread implementation of EDI until just recently. Now, however, these problems are being overcome through established standards that stipulate common data formats and security protocols. Automatic routing of information throughout the offices allows forms-based transactions such as the 4209s and 125s to be sent directly to each member involved in the approval process and reduces turnaround times for forms processing.

♦ *Handle mixed formats.* To the extent possible, an information system should enable users to generate reports in a variety of formats: text, graphics, and spreadsheets. While no information system can prepare all of the reports, charts, and spreadsheets that may be required by management and staff, FMSWIN can meet many of those needs, primarily because

it takes advantage of Microsoft Windows. Windows has been designed to share information easily across its member applications. Information from one application can by copied to a "clipboard" then inserted into another application. In addition, application objects can be inserted into other applications, or "linked," such that changes to the linked object are reflected in the entire application. For example, if a user changes a spreadsheet that is linked to a word-processing document, those changes will be reflected in the word-processing document. Thus, Windows features enable the Facilities organization to generate a wider range of reports than would be possible with proprietary information standards.

♦ *Provide archival capability.* An information system must provide management with a flexible archival capability. Past historical information must be readily available to management to provide insight into business decisions.

PROGRAM REQUIREMENTS

A Facilities-oriented information system must meet the requirements of four primary program functions: inventory management, project planning and approval, design and construction management, and real estate management. In the following subsections, we provide a general description of some of those requirements. Identification of specific requirements will require a detailed analysis of the business processes used by the Facilities organization.

Inventory Management

Facility inventory data serve as the core or foundation of the facility information system; the data are used for all Facilities functions. Facility inventory information is generally static; relatively few changes are made, making the information easy to track in a database format.

The inventory management function requires flexible report generation in order to support users in their need to answer inquiries at all levels of the organization. Inventory data serve as a basis for developing and analyzing macro-level programming and forecasting. For instance, the data should be used for developing projections and annual facility reports to upper management, including such elements as actual and percentage annual changes in facilities. In addition, the database comprises historical facility information, such as lease and construction costs, which should be accessible to system users so they can better perform their daily functions.

The system must be able to sort information based on different criteria to evaluate individual and group performance as well as to identify trends or patterns. In addition, senior management must be able to obtain information quickly without

having to go to the field for input. The system must be able to create reports using the database, although the format may not have been considered at the time the system was developed. Moreover the system should permit users to save custom report formats for use on a recurring basis.

The following is a sample of information that the Facilities organization should maintain for its owned facilities:

- ◆ Facility name, identification number, complete address (mail and E-mail), and telephone and fax numbers

- ◆ Type of facility

- ◆ Description of the property including such items as land area; building size (gross square feet); date occupied; type of heating, ventilation, and air conditioning (HVAC) system; type of lighting system; fuels used; type of handicapped access; environmental concerns; etc.

- ◆ Dates and coded description of major maintenance (roof repairs, painting, HVAC system repairs, parking lot paving, etc.)

- ◆ Financial data including cost of land, cost of improvements, total value, and date assessed.

Information that should be maintained on leased facilities includes the following:

- ◆ Facility name, identification number, complete address (mail and E-mail), and telephone and fax numbers

- ◆ Responsible unit, size of facility, and type of operation

- ◆ Lessor information such as owner, name of contact, complete address (mail and E-mail), and telephone and fax numbers

- ◆ Terms of the lease; effective date; termination date; annual rent; payment schedule; renewal options and terms; purchase options and terms; party responsibility for maintenance, utilities, and taxes; tax code; base amount; total liability; and amount of tax bill

- ◆ Financial data including cost of land and improvements, total value, and date assessed.

Project Planning and Approval

The project planning and approval function requires access to a variety of information, obtained from a number of sources. However, specific facility or project requirements vary from project to project and for each category of facility. A small or medium customer-service facility has a much different set of requirements than a major processing and distribution center. However, the analysis within each facility category typically remains the same. Since the process is repetitive in nature, operations tasks, calculations, and estimates can be automated.

Expert system modules, which use "if...then" modeling and analysis, can be implemented in order to analyze various options relating to a project or master plan. This analysis should be performed using information from both external and internal databases, including the existing historical information contained in the inventory database.

Planning for proposed projects should be accomplished with programs that integrate the features of computer-aided design and drafting (CADD) programs with word processing and spreadsheet software. The preparation of planning documents should be automated to the greatest extent possible. For example, once mail volumes and planning assumptions have been determined for a new project, a CADD program should be used for developing schematic designs and generating associated detailed area takeoffs, as well as estimating construction costs using unit costs obtained from the database. The program should summarize the results using word processing and spreadsheet templates that are directly linked to the CADD program.

In addition, each project analysis, along with the associated outcome, should be maintained in the system. That historical facility information can be used as the basis for planning future projects.

The system should provide easy access to information such as the following:

♦ Projects being planned. The system should provide detailed information as well as summary information, by district and area, as well as for the entire nation.

♦ Multiyear capital improvement projects listed by district and area, as well as a national summary.

Design and Construction Management

The design and construction function consumes a significant portion of the Facilities organization's financial and human resources. The primary activity involved in this function is contract management. Large, costly projects require close supervision to prevent schedule and cost overruns, and small projects often have quick turnaround times, requiring careful coordination. Management of either type of project requires the support of a reliable and easy-to-use information system.

Project managers have different support requirements depending on the management style of the individuals as well as the type or size of the project. For instance, MFO projects need more detailed scheduling capability than most FSO projects. However, the differences have to do more with the level of detail that is needed rather than functional capabilities themselves. The primary information

needs of this function are centered around contract preparation, scheduling, and payments and approvals.

CONTRACTING

The design and construction staff uses a variety of different contracting mechanisms to acquire services (A-E, construction management, design/build or construction, etc.). Those mechanism include fixed-price contracts, guaranteed maximum price contracts, cost-plus-fixed-fee contracts, and IQCs. An information system should be capable of producing any of these documents. It should also have the flexibility to make relatively minor changes or additions to the documents for unique circumstances.

All pertinent contract information should be accessible within the system for future reference, analysis, and comparisons with other projects. At a minimum, the information should be accessible based on the project, the service provided, type of contract used, and the contractor used.

The system also should be capable of analyzing bid data. For instance, some contracts rely on a combination of a fixed price with additional unit costs. The system should automatically analyze these data elements based on each bid submitted. The analysis should include best-case, worst-case, and most likely scenarios, allowing for differing or unknown site conditions. This information could be used in conjunction with other information contained in the system, such as past contractor performance, experience, and reputation.

SCHEDULING

The requirements for scheduling vary from virtually none to full-blown project management systems, depending on the size and type of the project. Typically, projects costing less than $500,000 involve only a few trades. These projects do not require scheduling capabilities much beyond simple milestones and a graphical representation, such as a Gantt chart. Several scheduling software packages, such as Microsoft Project, meet the needs of project managers on small projects. Activities should, however, be broken down in enough detail to identify potential schedule problems or front-end loading of the requisition.

At the other end of the spectrum are large projects valued at several hundred million dollars. These projects are complicated and require sophisticated schedules. Accurate tracking and management of the project require resource-loaded critical path method (CPM) schedules indicating costs and manpower usage. Major projects requiring detailed schedules would normally require one of the industry standards, such as Open Plan Professional or Primavera.

Typically, the contractor is required to produce and update a schedule on a large project, but the Facilities project manager needs a tool with which to carefully

analyze the logic and activity sequencing involved. Ideally, the information system should be able to perform this analysis on a schedule submitted by a contractor. Data from the external scheduling application could be manually or, more preferable, automatically downloaded to the information system for this analysis. The system also should be able to update the schedule automatically based on payment approvals. Payment approvals can be linked with the progress schedule using the project work breakdown structure.

PAYMENTS AND APPROVALS

Authorizing funding and approving payments are two activities that are required on every design and construction project. Since payments extend over the life of each project, the information systems can be used to simplify the process. The ultimate goal is to minimize the amount of time required for each project manager, contracting officer, FCT, and data processor to approve and process payments, while still maintaining the proper checks and balances. Payment approvals require similar types of analysis to be performed each month, allowing for the implementation of an intelligent system to perform all or a portion of this function. Most projects are structured so that an independent third party, such as a construction manager or A-E, approve, and make recommendations based on, the contractor's requisition. This ensures that the request for payment has been thoroughly reviewed and is valid and that the work has been completed. The construction manager or A-E should be required to submit the requisition to the Facilities staff in electronic format in order to minimize staff time and to allow the system to analyze the data.

Electronic payments can be performed using electronic funds transfer (EFT) on most requisitions and invoices. As seen in other organizations within the Postal Service, EFT can save a substantial amount of time and money.

In addition to tracking requisitions and making payments, the information system should also provide both the project manager and senior management with detailed analysis and budget projections for each project. These projections should include the initial contract amount as well as change orders and claims that have been submitted and settled or are outstanding. The projections could automatically be compared against historical payment profiles of other projects that are similar in scope. Such comparisons would enable management to identify any abnormal cash flows or costs. Projected project expenditures, based on the contractor's resource-loaded schedule, should be entered into the system at the start of the project for use in comparisons as well. This type of analysis would help to alert management of any potential problems or cost overruns in the early phases of the project, when there is still time to address the problem.

To accomplish the various activities associated with the design and construction function, managers should have on-line access to the following types of information:

- Project status, including schedule (with automatic flags for potential problems) and finances (authorized, committed, and paid)

- Project cost data (cost per square foot, design fees, change-order costs in comparison to original contract value, etc.)

- Solicitation, award, and completion time frames for contracts and task orders, including computation of the number of days duration for design and construction for each type of project (new construction, R&A, etc.) and comparison of planned to actual schedule

- Project execution rates (individual, office, and portfolio), such as the time from the client request for a project to beneficial occupancy or the number of leases renewed in a given time period

- Project manager workload (individual electronic time sheets should feed the workload analysis)

- Inventory (real property) characteristics

- Projects being designed (both detail and summary, by district, area, and nation)

- Projects under construction (both detail and summary, by district, area, and nation).

- Name and performance of all Facilities consultants and contractors, including both active contracts and completed contracts covering the past 10 years and available by district, area, and national sorts.

Real Estate Management

The real estate function is less dynamic than the design and construction function. Once a lease has been negotiated and agreed to, the lease information serves as the basis for future payments over the life of the lease. Few, if any, changes are made until the lease is nearing its expiration date or some other data element needs to be updated. Therefore, the primary user interface occurs at the beginning and end of the lease. Information systems can be put to best use during these phases in order to assist the real estate staff.

CONTRACTING

One of the main responsibilities of the real estate staff involves the preparation and execution of contract documents for lease or purchase transactions. This

work requires the support of an information system that can assist in the production of these documents. The system should have enough flexibility to modify or to add attachments and clauses to the standard documents. This could be performed either through the system or through the use of files, developed from external software applications, that can be imported into the system.

The system should periodically notify the real estate staff of all leases expiring in the near term, allowing sufficient time for the staff to take appropriate action. Once a lease is renegotiated, the record should be updated accordingly, and the system should automatically transfer the data to other systems used for budgeting and payment purposes.

Another aspect of the real estate function involves contracting for various consulting services such as appraisals, surveys, subsoil testing, and environmental assessments. The information system should have standard contracts available to easily award and execute these services. Information pertaining to the associated project, site, or facility, including address and legal description, should automatically be imported into the contract to minimize staff effort and to maximize production.

The real estate module should also be linked to a finance and accounting system. Once a lease has been executed, the pertinent data should automatically be transferred to the finance and accounting system. This system should then process payments without the need for any interaction from the real estate staff.

REPORT/INFORMATION REQUIREMENTS

At a minimum, the information system should be capable of providing the real estate staff the following information in a variety of formats:

- ◆ Lease information:
  - ◈ Expiring leases by date
  - ◈ Data on terms and options
  - ◈ Portfolio trends, including costs and number of leases signed within a certain time frame (for comparison to prior similar time frames)
- ◆ Land acquisition costs sortable in different ways.

Other Information System Functions

In addition to information requirements associated specifically with inventory management, project planning and approval, design and construction management, and real estate management, the Facilities managers and staff need on-line access to a general library of standards and references.

The library should include the following:

- ♦ All USPS design standards, for example, Medium Standard Building Design (MSBD), Small Standard Building Design (SSBD), STORCAD/D, modular post offices, exterior signs, Postal Express, and processing and distribution facilities

- ♦ USPS facility cost database

- ♦ Master specifications

- ♦ Handbooks and manuals

- ♦ Facilities bulletins

- ♦ Management instructions

- ♦ Policy letters

- ♦ Industry reference codes and standards.

In addition to maintaining the library, the information system should provide access to other systems and networks—*Commerce Business Daily* (CBD), Dodge Reports, Census Bureau, etc.—that contain useful data.

The library system should be created and maintained and made available for downloading from a home page on the publicly available network. Although the natural inclination for this type of repository would be to locate it at headquarters, elements could be maintained by centers of expertise anywhere.

Chapter 4
ASSESSMENT OF FACILITIES MANAGEMENT SYSTEM PERFORMANCE

This chapter presents our assessment of the system architecture and the ability of the system to support its users. Our observations are based on our interviews with system users at all levels in the Facilities organization, from managers and administrators at headquarters to staff in several field offices. Our visits to Facilities offices to conduct interviews enabled us to observe FMS performance in the context of day-to-day business, which provided useful insights about both the functional needs of managers and staff and the system performance requirements. We also attended system training classes and reviewed various Postal Service references and handbooks.

System Architecture

In our assessment of FMS architecture, we focused on network structure, hardware, and software in the context of reliability and responsiveness. Response, or processing, time is a key measure of a system's performance because of its effect on productivity and thus on costs. For example, a reduction in productivity of just 10 minutes a day—that is, if each of the 1,000 FMS users spends just 10 minutes a day waiting for the system to respond to a query or process a request—could cost the USPS more than $1 million each year.[1]

CENTRAL DATABASE

The current Facilities database utilizes a centralized structure. Since all FMSWIN data are stored in a central database at San Mateo, all users of the system are affected if the central server goes down—a major drawback to a centralized database. Since FMSWIN was brought on line in November 1995, the system has been down several times. While some shutdowns are not uncommon when a new system is brought on line, each shutdown is costly. For instance, in the Facilities organization, as many as 250 to 300 users may be idled when FMSWIN shuts

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[1]We assume 260 workdays per year and an average hourly rate of $22 to $25 per user. Thus, 0.17 hours per day x 260 workdays per year x 1,000 users = 44,200 hours lost productivity, which equates to $972,400 at $22 per hour or $1,105,000 at $25 per hour.

down. Assuming an average hourly rate of $22 to $25 per user, each shutdown costs an estimated $6,600 to $7,500 per hour. If the system is down for an average of three hours a month, the annual cost to the Postal Service would total $237,000 to $270,000.

To prevent productivity losses caused by a system shutdown, companies that rely on a single, central database often have mirrored, backup sites that contain replicated data from the main server and come on line when the main system goes down. Although the backup data may not be as current as the production server, users are still able to perform their duties. Other companies with several offices use a system with decentralized databases. In that configuration, each office has its own copy of the data, which are replicated to a central server at predetermined times. If the central database fails, users are still able to work on the local copy of the database. This setup also isolates the users from problems with the WAN. If interoffice network communication fails, users may be isolated from the central database but are still able to access the local system.

Another characteristic of the Facilities network structure is the relatively long transmission and response time on the PRN. The LAN, which uses IPX transport protocols, is almost twice as fast as the PRN, which uses TCP/IP transport protocols. The LAN is faster because, when data are transferred using IPX, the path to the destination is predetermined. In contrast, TCP/IP will not take advantage of best-path computations unless it is specifically set to do so.

When evaluating network throughput, one must consider the path and distance a data packet must travel to reach its destination. Interoffice LAN throughput is typically faster than WAN or Internet access because the distance a packet must travel is usually only a few hundred feet as opposed to several hundred miles for a packet transferred on a typical WAN. In addition, a data packet sent through the LAN needs to traverse only one or two routers to reach its destination, while a packet sent through a WAN may have to traverse more than two routers, depending on the WAN's configuration, to reach its destination. Traversing the USPS network is even more convoluted than a typical WAN; a packet sent through the PRN often must traverse four or more nodes before it reaches the target machine.

Packet size also can affect network throughput if the size exceeds the network bandwidth (amount of information the network can carry). Up to that point, however, the size of a data packet has no effect on the time it takes to travel the network, so slower networks typically utilize larger data packets to increase the amount of data transferred.

The current network structure does have some advantages. In particular, the use of Pentium-based application servers that manage software usage allows the ISCs to track and update software packages more efficiently. Instead of loading software on each individual machine, the ISCs can do it through the application servers.

HARDWARE

Only in the last few years have computers become widely used within the Facilities organization. As recently as four years ago, some FSOs had only three PCs, which were used by secretaries, and a handful of other terminals, which were used by FCTs to access the FMS. Moreover, some of the equipment was of inferior quality because of the constraints placed on Facilities by the USPS information systems purchasing list. Equipment was included on the list on the basis of its low initial cost, rather than the best life-cycle cost. As a result, the Facilities staff frequently experienced reliability problems with the equipment.

Today, while the extent of PC use in Facilities offices still varies, the offices we visited that are using PCs have either 486s or Pentiums. The new standard for Facilities is to supply Pentium laptops with docking stations for staff members who travel regularly and stationary Pentiums for the office staff. Appendix E lists the hardware typically found at headquarters, the MFO, FSOs, and district offices.

Because the current client–server combination is memory intensive, resource requirements for the PCs hosting the client application are relatively high. Users have complained that they are unable to run other Windows applications, such as Microsoft Word or Excel, while using the FMSWIN front end. PSI has concurred that this is a problem and that the system requires PCs with at least 16 MB of RAM in order to run smoothly. Various other hardware problems also affect performance. For example, processing time is important, and some of the 486s with 33 MHz are much slower than other PCs.

SOFTWARE

Software is one of several factors that influence the system response and processing time. Following the migration to FMSWIN, system performance was significantly degraded and response time slower than with FMS+. However, with the latest release of FMSWIN, version 1.09, transaction times are expected to be comparable to, if not better than, the FMS+ system.

Another consideration when assessing software is its compatibility with other applications. The Facilities software standard, Microsoft Office Suite, is compatible with many programs and permits easy transfer of data. However, during our interviews, FMS+ users revealed a difficulty in moving between applications. This problem arises when the user needs to access information in the system database as well as an external program. The intent of FMSWIN is to provide the additional capability of switching between various Windows-based documents, including FMSWIN, Microsoft Word, and Excel. The user will also be able to cut, copy, and paste from other applications to FMSWIN documents. However, Powerbuilder is memory intensive, requiring a significant number of dynamic link li-

braries to be loaded to make it usable. System memory problems have greatly limited the switching capability.

Another concern is the client–server software. The use of Powerbuilder and Oracle is common in a client–server combination; the combination has proven to be effective for enterprise-wide databases and to be stable across a LAN. It is, however, quickly becoming one of the slower packages available on the market. Newly developed packages, such as Delphi, are considerably faster.

User Interface

In our assessment of the ability of the FMS to support its users, we looked at some general aspects of overall system performance as well as aspects involving the performance of specific program functions.

OVERALL PERFORMANCE

Paper versus Electronic Business Processes

The use of PCs and communications technology is rapidly increasing in the Facilities offices. However, to date, the application of electronic systems capability has principally been to replicate paper processes electronically. For example, we reviewed flow charts of some of the Facilities primary business processes such as A-E selection, construction solicitation, site acquisition, and lease renewal. Typically, only a small percentage of the many steps in the processes were performed electronically. Appendix F includes workflow diagrams for a selection of USPS Facilities processes that we reviewed and illustrates the extent to which information technology is integrated into those processes.

A good example of this integration, or the lack thereof, is found in the contract payment and approval process. While it varies slightly from office to office, the following is a general overview of this process:

> The contract payment process begins each month when the contractor submits a paper copy of Form 4211B, either to the A-E or the construction manager or directly to the USPS project manager. The A-E or construction manager reviews and makes recommendations regarding the requisition; the project manager relies on a signed copy of the concurrence by the A-E or construction manager to verify that the work completed for the period matches the requisition. The contracting officer then verifies and approves the payment by signing the 4211B and gives the signed copy to an FCT for entry into FMSWIN. In addition, the signed hard copy of the 4211B is mailed to the St. Louis PDC; St. Louis takes no action on a payment until it receives the hard copy. Once the PDC receives the hard copy, the data processor in St. Louis accesses the electronic copy by entering the control number, found on the hard copy,

into the system. The data processor verifies the approval information and the signature, then enters the payment information into PACS for payment with the next hard copy check run. If the electronic copy of the 4211B does not appear in the system, the hard copy is supposed to be returned to the originating office.

The contract payment and approval process is a paper-based procedure with electronic entry and recording. The electronic entry is used to store the information in the project record database as well as to initiate check payments. With this particular methodology, the efficiencies gained in using electronic interchange and processing are all but eliminated. It has been estimated that the payment and approval process in an FSO can involve up to as much as one person-hour of work for each payment. The FSOs and MFO manage some 1,000 projects each year. Adding in the R&A projects at the area and district offices brings the total number of Facilities projects, managed annually, close to 10,000. With contractor and A-E requisitions being submitted on a monthly basis for these projects, the cost of verifying, approving, and processing payments in this manner is significant.

In our interviews, we were told that the paper trail is being maintained to meet a requirement of the USPS auditors. However, we discovered that another organization within the Postal Service, inventory management and purchasing, conducts some of its business using electronic commerce without having to maintain any paper trail or paper records.

The best example of the use of electronic commerce in the Postal Service involves the procurement of retail signage. The vendor has a multiyear contract that requires the use of EDI for ordering, tracking, and invoicing. The Postal Service staff does not have to review or approve any shipping tickets, invoices, or other information regarding the order since it is performed automatically by the system. Payment approval on the contract is also performed automatically by matching key data elements that appear on the electronic copies of both the order and the invoice. Once verified by the system, the funds are dispersed directly to the vendor's bank using EFT.

The inventory management and purchasing organization does not maintain any paper copies of the records associated with the procurement of signs. All information about each order is maintained only in an electronic database. However, the contract requires that the vendor keep hard copies of the records for three years. That arrangement satisfies the auditors and saves handling and storage of these documents at the USPS.

Electronic commerce, which saves both time and money, could be a valuable tool for the Facilities organization. The use of EFT alone would save at least $3.35 per transaction and could save nearly $11.00 per transaction, as shown in Table 4-1.

Table 4-1. Comparison of Payment Methods

Method of payment	Cost per transaction[a]
Electronic funds transfer	$0.11
Conventional paper check	$3.50 to $11.00

[a]Transaction costs provided by the USPS inventory management and purchasing organization.

Standardization

The use of standardized business documents, such as letters and forms, makes the performance of daily tasks more efficient and less prone to error. Our examination of documents that are produced frequently at the Facilities offices we visited revealed a lack of standardization, not only between offices but also within each office. In several instances, we found documents that were prepared by the same employee and that served the same purpose, but the wording differed. Wording differences indicate that each document was produced from scratch, which is an inefficient use of resources.

Some standard forms and templates have been created within FMSWIN. However, given the number and variety of repetitive functions performed by the Facilities staff, such as lease negotiations and solicitations, it appears that the use of standardized templates could be significantly expanded. The FMS contains much of the information needed to generate customized forms and letters from standard templates. For instance, the system includes facility identification numbers, facility and lessor addresses, lease information, and points of contact. Developing templates that automatically import the relevant data would prevent the user from having to "reinvent the wheel" each time a form must be generated.

Data Quality

In our interviews, a number of Facilities staff commented about the reliability of the existing data. Some had little confidence in the data, while others felt that the integrity problem was limited to certain data elements. In either case, the users have less than complete confidence in the elements contained in the database. The quality of the data may be unreliable for a number of different reasons:

- ♦ Information is entered incorrectly, either because of human error or the lack of clean protocols defining entry requirements.
- ♦ Data fields are left blank at the start of a project and are never filled in.
- ♦ Project and facility information is not updated by the project manager.

FMSWIN has been designed to prompt the user for correct data entry in several locations, using drop-down menus in lieu of function keys. This approach should

improve the reliability of new data in the areas without standard protocols. However, unless the existing data are reviewed against these new protocols, the reliability of the data will remain in question.

It is also important to realize that the responsibility for the quality and reliability of the data in the FMS rests with the people that use the system. Managers and staff must have an "ownership" attitude about the database and be aggressive about seeing that the information is input completely and correctly. Field managers must also work with headquarters to establish standard protocols and definitions to facilitate uniform interpretation of the data fields and to ensure that the information on buildings in their territory is current.

The FMS should be viewed by the field managers and their staffs as an asset that enables them to do a better job and to increase production. The program support staff and information specialists should be viewed as facilitators that can assist in getting their requirements met. It may take a rather fundamental shift in the culture within Facilities for this to occur, but the shift is essential so that line managers and staff can take full advantage of the capabilities of the system.

Timeliness of Data

The accuracy and dependability of an information system is measured, at least in part, by the timeliness of the data. If the system is providing outdated information, the user cannot rely on the information as a basis for making decisions. The database becomes simply a mechanism for storing historical information.

In FMS+, managers and staff did not have access to real-time data. Data downloads from some systems, such as PACS, were performed up to one week apart. FMS+ data often were inaccurate and conflicted with data contained in other subsystems. Facility staff that we interviewed expressed frustration in their attempts to get accurate, up-to-date information from the system.

With FMSWIN, data in the various information subsystems are being synchronized with data being downloaded a minimum of once a day. However, the system still does not provide on-line access to frequently used, pertinent information. For instance, payment approval screens do not have complete, real-time information, so the project manager must refer to paper files in order to approve payments. In addition, to respond to contractor requests for information, such as the check number, date, and amount of a payment for a requisition, the project manager or the FCT must contact the data processor at the St. Louis PDC.

Providing real-time system information to the user is important for maintaining confidence in the system and for minimizing the use of inaccurate or outdated information, which can be costly to the organization.

PROGRAM PERFORMANCE

Inventory Management

Since the dramatic reduction in personnel resulting from the 1992 reorganization, the Facilities organization must perform its functions with far fewer people than before. Therefore, to complete its work, the Facilities staff must be exceedingly efficient; there is little tolerance for working with systems and procedures that are inefficient. However, our interviews revealed that the staff is not adequately supported by a reliable and effective information system.

In addition to the system not being designed to support the staff and business processes of the Facilities offices, many users are concerned about the quality, timeliness, and the ease of access to the data contained in the FMS database. The fact that these concerns exist is evidence of the impact of a system that does not support the users' needs.

REPORT AND QUERY CAPABILITIES

The FMS+ had the capability of generating 29 standard reports (listed in Appendix G). It also had a query function that allowed specific data to be extracted from the database. However, many people we interviewed were unaware of the many standard reports and never attempted to generate either standard reports or custom queries.

Users that had attempted to run queries on the database expressed frustration primarily because of the complexity in working with the text-based system. As a result, the ISCs were frequently asked to run queries. FMSWIN, with its Window-based, graphical user interface, is much easier to navigate. Also, the FMSWIN main menu has a report section, which should make it easier for users to generate reports or to run queries to produce customized reports.

While standard reports have been developed in both FMS+ and FMSWIN, they fail to provide detailed summary information, particularly that most useful to senior management. For example, a report on expiring leases is produced monthly and is a valuable tool for FSO managers in identifying facilities that require some action on the current lease, whether it be termination or renewal. The information in this report can be sorted by date, project manager, and district office, among other criteria. However, the system does not generate summary data, such as the percentage of expiring leases that have been renegotiated. FSO managers use this type of summary data as an indication of lease renewals completed to measure performance. Because the data are is not automatically generated, managers must extract the data manually and compile a spreadsheet for further analysis.

Without proper reporting capabilities, management is not able to gain any valuable insight about operational and performance trends. In addition, manually compiling data, which already exist in the system, is an inefficient use of resources.

HISTORICAL DATABASE

The FMS database has the potential to contain valuable, statistical information that should be available to both managers and staff. (Appendix H lists a sample of the data elements currently contained in the FMS.) However, the system does not allow the end user to access information from this historical database without special programming. Because of this lack of flexibility, the Facilities staff has no way to systematically capture data such as the following:

♦ Historical construction costs, including cost per square foot and costs developed by the Construction Specification Institute

♦ A-E design costs, by architect or facility type

♦ Project management costs, by construction management firm or facility type

♦ Life-cycle costs

♦ Trends of lease rates or construction costs.

The existing database could serve as another tool for managing and analyzing performance and costs more effectively. For instance, if the database shows that construction costs on a completed project are high relative to historical construction data, management can identify the reasons—for example, design problems, including materials and construction methods—and can take appropriate action to reduce costs on future projects.

Similarly, the FMS provides only limited information—in reports on completed projects and workload—on overall productivity for individuals. Neither FMS+ nor FMSWIN collects or provides useful information relating to standard productivity measures. That information can be used for identifying how the staff, or office, is doing compared with general standards or guidelines.

Project Planning and Approval

The Facilities staff uses a number of different planning documents depending on the size and type of the proposed facility. The following is a list of these planning documents:

♦ Facility Planning Concept (FPC). The FPC is a computerized program used for planning small, standard plan buildings with less than 6,500

square feet in area. Once the FPC form is completed, the program auto-
matically selects the type of building needed.

♦ Form 919, Facility Planning Data. This form is used for planning cus-
tomer-service facilities with more than 6,500 square feet. The form is
typically prepared by the facilities specialist using standard USPS planning
criteria.

♦ Form 929, Major Facility Planning Data. This form, which is in a com-
puterized format, is used for compiling major facility planning data. The
data, which include detailed space computations for the entire facility, is
put together by a postal operations analyst.

♦ Decision Analysis Report. This report serves as the primary vehicle for
planning new, major facilities. The process involves compiling, analyzing,
and formatting various data elements and requires about 240 person-hours
for smaller projects and up to one person-year of effort for large, more
complex projects.

Those documents are effective tools for identifying the needs of a new postal fa-
cility, assisting staff in the development of detailed program and space require-
ments for a facility. However, while these planning documents are generally
considered to be automated, each requires an extensive amount of research and
compilation of data. The data are obtained from a number of independent and
fragmented sources, including finance and the FMS. For example, completion of
the FPC requires data contained in the FMS and in the building lease; the data
must be manually retrieved and transferred into the FPC program.

Certain data elements and assumptions used in the planning programs must be
consistent with those used in other programs. Typically, however, the programs
are not integrated, and in some instances, the format is not consistent with Postal
Service standards. For instance, the finance staff still prepares data using Lotus
123 while the standard is Excel, and certain data used in completing Form 919
must be consistent with the retail analysis program. However, because the two
programs are independent, they cannot share this information. Deciphering and
replicating the data are left up to the Facilities specialist.

Similarly, only a limited amount of integration exists between the planning pro-
grams and the programs used in the design process for laying out the proposed
facility. Instead, designers interpret and translate the data from the planning pro-
gram into a computer-based design system.

Linking planning programs to one another, as well as to other design programs
and systems, would streamline the tasks of the Facilities organization and would
ensure that data are used consistently throughout the facility development process.

Contracting

Contracting is one of the major functions done by both the design and construction and the real estate staffs. Both of these groups use the FMS for generating solicitations and preparing contract documents.

SOLICITATION AND AWARD PREPARATION

The design and construction and real estate staffs generate solicitations for a variety of reasons—leasing or purchasing land or hiring an A-E or contractor, for example. With FMSWIN, standard solicitation documents are included with the contracts section on the main menu. Notes can be added, using FMSWIN, to customize the solicitation. However, the system allows users to add only five lines of information in the notes section before they must create an attachment. Attachments and addenda must be produced using another software package.

A typical FSO may produce more than 200 solicitations each year. Each of these solicitations is publicly advertised in the CBD and in local newspapers. Submissions to the CBD must be in a standard format and include specified information. That information exists in FMSWIN, but it is not automatically transferred into a template using the standard CBD format. The information is rekeyed into the proper format so that it can be either faxed, sent electronically, or mailed to the Commerce Department.

FMSWIN is also used in the award process once the solicitation and negotiation process has been completed. The system is used to commit funds for both the A-E and construction contracts using Form 4211, which is completed by the FCT. A paper copy is approved by the contracting officer and sent to the St. Louis PDC. At the PDC, data processors verify the paper copy against the electronic copy and set up the project in the system for future payments against the funds identified in the 4211.

CONTRACT PREPARATION

Contract documents for real estate leases and purchases are prepared using FMSWIN through RECS. Contract documents for construction projects are prepared in a similar fashion using DCCS.

RECS is used to produce a final copy of the lease agreement, following the site selection and negotiation phases. A hard copy of the lease is printed and is signed by both the lessor and the appropriate contracting officer. FMSWIN is then used to generate Form 125, which is required to make lease payments. The 125 is completed by rekeying information contained in the lease agreement into the FMS. An approved hard copy is then sent to the St. Louis PDC for processing.

The real estate staff relies heavily on RECS. Since they spend a great deal of time in the field, remote system access could improve productivity. Only a few of the real estate specialists we interviewed said that they had accessed the system from the field. One reason for this limited access is the lack of proper hardware to dial in from a remote location. In addition, those who use the capability complained that it was extremely slow in processing and downloading data. Purchasing Pentium laptops for the Facilities staff may increase the use of computers in the field.

RECS, which replaced the original Document Generating System (DGS), was highly praised by many of the users that we interviewed. It has additional capabilities and flexibility that DGS lacked. For example, the FCT frequently had difficulty entering the proper information into DGS because of the method the system used to prompt the user for information. Since the final document could not be viewed on screen, a hard copy had to be printed in order to determine if the correct clauses and contract information were included. If not, the FCT attempted to enter the correct information in the system, repeating the process until the contract was correct. Documents were also frequently corrected by manually cutting and pasting different documents together until the contract was correct. With RECS, data entry is much easier and the system is more flexible. However the FCT still cannot see the final document without printing it. RECS also has the added capability to cut, copy, and paste other Windows-based documents, including Word or Excel documents, into the contract as addenda, notes, or attachments.

DCCS is supposed to be used by the design and construction staff in much the same way as the real estate staff uses RECS. However, when DCCS was initially released, it had too many problems with the contract language provided by purchasing and was recalled. It has since been overhauled and has just recently come on line.

Design and Construction Management

Contract administration concerns the delivery of a quality product, on schedule and within budget. Project managers used the FMS as a tool to help manage project schedules, budgets, and payments. To address quality and production issues, the Facilities organization has undertaken a separate initiative to standardize building components and plans.

SCHEDULING

The scheduling capabilities within FMS generally consist of predetermined, major milestones. The following milestones are examples of dates required for different types of projects:

♦ Project start date—always required

♦ Project completion date—always required

♦ Site dates—required if project type contains funding category for site

♦ Design dates—required if project type contains funding category for design

♦ Construction dates—required if project type contains funding category for construction.

With FMS+, the scheduling feature was used primarily for managing the project from a global perspective, without any detail included. However, FMS+ lacked capabilities that are fundamental to scheduling, such as activity linkage. Activity linkage involves associating the start or finish of one scheduled activity with that of another and serves as the basis for CPM scheduling, which is common to the construction industry. In addition, the schedule cannot be depicted graphically in either a CPM or Gantt chart format. These graphical representations are useful for quickly identifying project status.

This lack of flexibility forced project managers that wanted to use scheduling software to use other scheduling packages to manage projects. Currently, some of the project managers use the FMS, some use Microsoft Project, and some do not bother to use any scheduling software. And without a standard schedule format, it is difficult and time consuming for management to analyze project data. Since the data are sometimes not available from the system, managers must create project status reports, using word processing or spreadsheet software, which are independent of the FMS and the scheduling software.

One of the primary reasons that FMS+ was not a valuable tool for managing projects is that users are required to enter data elements, such as revised, general milestone dates, that do not directly support performance of their work (as they perceive it) and do not increase their productivity. An information system should be designed to include only those data elements that add value to the processes and are useful to the staff supported by the system. Ideally, managers should be able to obtain the information they need from this same data set without burdening the staff with requirements for generating reports.

Another useful scheduling tool is the capability to associate project activities with resources, such as expenditures or manpower. This feature allows the project manager to track the status of the project more closely by comparing the scheduled expenditures versus contractor requisitions. Similar manpower comparisons can be made to assess the contractor's progress. Such comparisons are needed because, while contractors are typically required to provide a work breakdown for the major activities on the project, a single activity may constitute up to five percent of the total contract value.

With FMSWIN, the project manager can add activities and milestones to the schedule and has the ability to link activities. The scheduling feature in FMSWIN

does not, however, have a protocol that integrates the work breakdown structure of a project with the contractor's payment schedule. Establishing this protocol would automatically link work performed to periodic progress reports, allowing project managers and team leaders to manage larger projects more closely.

In addition, since the FMS contract payment approvals do not directly roll over to update the project schedule, the schedule information is not updated as frequently as desired, if at all, resulting in unreliable data.

The system should also be able to take advantage of this same information to identify project problems automatically. The current system does not automatically flag and make managers aware of potential problems. As a result, managers may be unaware that a problem exists, resulting in reactive management when the problem is discovered. For instance, a missed project deadline may indicate that the project completion may be delayed, which, in turn, could lead to additional costs and possible litigation. If the system automatically notified a manager that a key deadline was missed, action could be taken to avoid possible schedule or cost overruns. Or if the manager was made aware that the dollar value of submitted change orders was exceptionally high, the problem could be addressed and resolved early.

FMSWIN is improved over FMS+ in project scheduling capabilities, and we have just pointed out some functional features that would enhance production further. However, a more fundamental point to consider is that Facilities does not have a standard definition of what is expected of project managers. Without a clear understanding of the project manager's role and the business protocols to be used, no information system will be satisfactory.

PAYMENTS AND APPROVALS

The payment and approval process is an important function in any organization. However, it can become a laborious, time-consuming task when an individual's responsibility extends beyond a handful of projects. Making full use of information systems relieves the employee of some of the more burdensome and less critical activities, allowing more productive time for other tasks.

The payment and approval feature is probably the most commonly used function in the FMS. Payments and approvals for both A-Es and contractors are processed using the FMS for all ongoing projects. The typical project manager at an FSO manages from 10 to 20 projects at any one time and may process up to 8 to10 payment approvals per day.

Several individuals are involved in the payment and approval process, including the project manager, contracting officer, FCT, and data processor. The current system does not automatically track the payment status and identify who is responsible for taking the next action. For example, the FCT must notify the con-

tracting officer—orally or through some other means such as E-mail—that approval is required on a payment. Automatic tracking of payment status and responsibility would streamline and improve productivity in the process.

Some facility purchases, such as architectural signage, is handled through the direct vendor system in the purchasing department. The process is set up so that all shipping tickets and vendor invoices go through this system. After payment is made through the Walker accounts payable system, the funds are expensed to the requesting office's budget. No mechanism is in place to charge the cost to the specific project for which the material was bought. Without this mechanism, the material cannot be capitalized with the facility under construction. These costs should be maintained, or at a minimum replicated, in FMSWIN so that each facility can be evaluated as an independent profit center.

QUALITY MANAGEMENT

Producing a quality product is an important aspect of project management and is an important goal for any Facilities operation. Allowing substandard design details or construction methods results in a shortened usable life. In a step toward ensuring a quality product, the Facilities organization developed CADD-based standard building designs—SSBD for small (up to 6,500 square feet) and MSBD for medium (up to 60,000 square feet) facilities—and it developed AutoCad-based programs for use in planning and programming for new building designs and in performing feasibility studies. The MSBD program allows the designer to select various building components, based on the programmed planning data, from a menu. The building components can then be pieced together in a number of different configurations to meet the needs of the facility and to meet the requirements imposed by the particular site. The design of the retail area, including customer-service counters and cabinetry, and fixtures, furnishings, and equipment are also included in the program. The design work left for the A-E includes the exterior shell, site adaptation, and major building systems for conformance with local building codes and climate.

Once fully utilized by the FSOs, the standard building design programs should improve the efficiency of the design process. (It is estimated that the program previously used by the FSOs saved between 2 and 3 percent of the standard 6 percent design fee.) Not only will the program improve the design process, but it also will be a valuable tool for assessing construction details and building systems. Performing postoccupancy evaluations on these facilities will help in the refinement of the standard plans in an attempt to improve and extend the usable life of buildings and systems.

Real Estate Management

Lease management typically involves such tasks as making tax and lease payments or identifying and performing maintenance. It also involves making sure that the lessor is upholding the terms of the lease. Facilities information systems play a primary role in managing the term payments.

Form 125 is sent to the St. Louis PDC where data processors manually rekey the information into the Rent/Lease System. The Rent/Lease System maintains all data necessary to make lease payments, including term, expiration date, and payment. Approximately 30,000 checks are released to lessors each month through this system.

Few problems were reported with the Rent/Lease System, probably because the real estate staff has little interaction with the system and because, once the data have been entered, little maintenance is required. The interviews did reveal that the system cannot automatically increase lease payments, even when they have been negotiated as part of the agreement. Instead, another Form 125 reflecting the new lease rate must be generated and sent to St. Louis for processing.

Another issue involves the ability to track future lease increases and trends. Lease renewals are handled in a similar fashion as the initial lease. Typically, leases are negotiated well in advance of the expiration date, with goals of completing 65 percent of lease renewals 18 months prior to expiration and completing 90 percent of lease renewals 6 months prior to expiration. However, although the125 forms for lease renewals are sent to the PDC, the data on the forms are not entered into the Rent/Lease System until approximately 1 month prior to the lease expiration. If the data were entered into the system, the lease renewal information could be used for determining future trends in lease rates and ultimately for the budgeting process.

Finance and Accounting

PROJECT PAYMENTS

The payment process for a Facilities project is initiated through FMSWIN, but payments are made using PACS. PACS financial data are typically regarded as more accurate and timely by the Facilities staff. When presented with conflicting data from PACS and FMS+, almost all users said they relied on the PACS data. Currently, project financial data in FMSWIN is downloaded from PACS a minimum of once a day.

BUDGETING

An important element in the budgeting process is the identification of future trends relative to the facilities. While the data for this type of analysis is contained in the system, the information is difficult to extract. For instance, FMSWIN does not allow managers to project trends for such things as changes in tax rates. In addition, because data on renegotiated leases are not input into Rent/Lease System until the month prior to expiration, there is no accurate method of determining the projected budget.

Other Observations

STAFF EXPERIENCE AND TRAINING

As a result of its comparatively recent shift to PCs, the Facilities staff is not thoroughly trained to use either FMS+ or FMSWIN. As a consequence, the staff is not able to take full advantage of existing system capabilities. For example, our interviews revealed that few people knew how to run queries and produce reports.

The staff has received general training on how to use the system. That training included formal FMSWIN training sessions in Norman, Oklahoma, as well as in Washington, D.C., and, to a limited extent, at the MFO and each FSO. However, more detailed training is often left up to the employees themselves. Staff members who are more proficient in working with the system are tasked with teaching others in the group. Because of time constraints, this instruction is typically limited to answering questions as they arise.

APPROACH TO INFORMATION SYSTEM DESIGN

With the exception of the RECS, the various program modules and features of the FMS have been designed by information systems specialists (with occasional input from users) rather than being designed around the business processes that the systems should support. The result of this approach is that the information systems that should support the daily staff functions, in reality, inhibit their production and efficiency. Instead of the system supporting the end user, the end user is supporting the system.

EXTERNAL FACTORS INFLUENCING FMS

Many constraints are imposed on the FMS by other elements of the USPS, including information systems, finance, and procurement offices. Each of these offices has its own perspective and, in some instances, may have imposed requirements of Facilities and the FMS that are inconsistent with sound business practices that would otherwise have been followed.

Conclusions

The Postal Service's facilities management information system has evolved over the past 20 years. As the system has grown over time and survived various reorganizations of the Postal Service and the Facilities organization, the demands placed on it have changed. Today, the FMS is being used for many different purposes than originally conceived. While it tries to be all things to all people, it does not appear to do many things very well. As a result, users are dissatisfied with the FMS; they generally consider it a liability rather than an asset. Table 4-2 summarizes our assessment of how well the FMS satisfies user requirements, using a rating scale of good to poor. In short, the overall performance of FMS+ was poor. And, while performance was improved significantly as a result of the conversion to a client–server system with a central database accessed by PCs with a Windows operating system, FMSWIN can, at best, be considered adequate.

Table 4-2. Summary of Assessment of FMS Performance

Requirements	FMS+ rating	FMSWIN rating
Overall requirements		
Customer service support	○	◓
Sound business practice support	◓	◓
Benchmark performance measurements	○	○
Respect of users	◓	○
System requirements		
Reliability	◓	○
Responsiveness	○	○
Use of current data	○	◓
User friendliness	○	◓
Flexible reporting capability	○	◓
Automatic routing capability	○	○
Support of mixed formats	○	◓
Archival capability	◓	◓
Program requirements		
Inventory management (reporting capability)	◓	◓
Project planning and approval	○	◓
Design and construction management		
Contract preparation	◓	◓
Scheduling capability	○	○
Financial support	◓	◓
Reporting capability	○	◓
Real estate management		
Contract preparation	●	●
Reporting capability	◓	◓
Other requirements (reference library)	○	○

Rating scale: Good   Poor

●   ◓   ○

Chapter 5
RECOMMENDATIONS FOR AN IMPROVED FACILITIES WORKPLACE

Given their critical information needs, USPS Facilities managers and staff need an information management system that takes maximum advantage of electronic technology. That system should be based on a careful evaluation of the Facilities business processes to ensure that Facilities uses all of the tools available in today's workplace. By aggressively embracing advanced information technologies to the fullest practical extent, Facilities will be able to improve its efficiency and cost-effectiveness.

With little doubt, the single most significant feature of today's workplace is the total integration of personal computers into the office. It is almost impossible to walk into a business or corporation and not find a number of people performing various activities on a PC; lower prices and expanding capabilities have made the PC an essential tool for the workplace. And by using that tool, organizations are seeing dramatic increases in productivity. Other electronic technologies that are changing the way business is done include videoconferencing, electronic records management, multimedia presentation technologies, communications technologies (voice, data, and images), and optical scanners. The Internet, too, is quickly becoming a driving force in the way the organizations do business. No longer limited to LAN and WAN activities, organizations are utilizing the Internet to help with business activities worldwide.

The technological advances that have been occurring over the past decade are expected to continue and to result in rapid improvements in the ability to move and process increasingly larger amounts of information (video, voice, and data) cost-effectively. As these advances become institutionalized, they will bring dramatic change to the office business practices of today.

From a USPS Facilities perspective, the timing of the advances in computer and telecommunications technologies could not be better. In this chapter, we suggest some steps that the Facilities organization can take immediately to enhance its information management system as well as propose a strategy for the longer term.

Near-Term Enhancements

The near-term enhancements that we recommend focus on simplifying and streamlining many of the tasks done by the Facilities organization. All of the actions we recommend can be accomplished in a few months at a relatively low cost. They are as follows:

♦ Develop templates, using the Microsoft Office Suite group of products, for most commonly used forms and letters. The documents should work with a local database that includes project-specific information that would be merged into the templates by use of pull-down menus. The combination of templates with the associated database would minimize the multiple entry of identical data, enhance standardization thereby reducing errors, and increase production for FCTs and real estate specialists. The numerous letters and notices associated with solicitations and contract actions constitute a major portion of the paperwork that is generated. (Refer to Appendix I for an explanation of the concept.)

♦ Establish the policy that the project work breakdown structure will be used as the basis for measuring progress and for making progress payments. In a related move, modify the FMS to automatically roll approved construction payments into the status report to update the percentage completed and the financial status accounting.

♦ Identify the information and report formats that are most frequently used by management and develop easily accessible reports. Routine project status reports, such as the blue book (*Status Report, Facilities Projects $2.5M to $7.5M*) and the yellow book (*Status Report, Major Facilities Projects*) should be automated and programmed to highlight exceptions. The formats should be refined to optimize communication of the information. The reports should be summarized at the front so that readers could select the parts of the report they need to read.

♦ Initiate a task to decide which scheduling software to use in-house and determine how data transfers from other software programs would be managed. An alternative is to specify the program that contractors and consultants must use on USPS work. (See Appendix D for information on scheduling programs.)

♦ Require contractors to submit updated progress schedules with their payment requisitions and to do so electronically using USPS-approved, industry standard software packages. Requisitions approvals by an A-E also can be done electronically over the Internet.

♦ Evaluate IPX as an alternative for the network. FMSWIN has been shown to work approximately twice as fast on IPX than on TCP/IP.

- Continue to purchase state of the art equipment, including laptops with modems and portable printers, for real estate specialists and project managers to facilitate remote system access. The standard should be Pentium, 100 MHz laptops with at least 16 MB RAM and docking stations with at least 17-inch color monitors.

- Install Windows 95 on user machines.

- Initiate a task to plan and implement videoconferencing capability within the Facilities organization. This technology is now easily affordable and can be used for design review meetings and for small group discussions for any number of management purposes such as project status meetings on major construction projects.

- Begin using digital cameras to record general progress or specific problem areas for discussion. The video can be downloaded directly into an on-site computer equipped with desk-to-desk videoconferencing capability. The videos could be easily transmitted to headquarters for discussions with senior management.

- Implement the use of electronic time sheets to serve as the basis for workload and productivity measurements. Activity breakdowns must be detailed enough to provide valuable information but not too detailed to burden the staff. All that should be needed is the project identification number and phase—for example, A-E solicitation, design coordination, construction solicitation, or construction coordination. Completion of the time sheet should take no more than two or three minutes per day.

- Develop a plan to enhance the staff's ability to access the Facilities information system while out of the office. Evaluate alternative remote access software. Design and construction managers and real estate specialists spend significant portions of their time away from the office, and their productivity would be improved if they could continue to handle all of their "office" business while on the road.

- Establish a USPS construction cost database that would keep a record of the project costs for all USPS Facilities projects using the Denver FSO approach as the model. (See Appendix J.) The Denver FSO could be designated as the center of expertise for the database and undertake its stewardship.

- Develop an Internet site for the USPS Facilities library of standards and references to be accessed by Facilities staff and their consultants. Headquarters should maintain the electronic library and home page; however, responsibility for updating specific references could be delegated to individual Facilities offices that could function as the USPS center of expertise on the topic. Change-management procedures should be carefully evaluated and established. The Internet site should also contain links to other useful sites.

♦ Establish measurement criteria and performance standards on individual, office, and corporate levels. Measurements should be based on information in the information system, such as number of leases or projects completed over a given time period (for example, a quarter or a fiscal year).

♦ Produce an annual facility status report that identifies changes from prior years. Examples include gross annual lease rate changes (national and office level), square footage changes (national and office level), and projects (both design and construction and real estate) under development.

♦ Target FMSWIN training to meet the varying needs of the different functional staff types in the MFO and FSOs.

♦ Review data elements currently maintained in FMSWIN and the associated systems and assess the value added for maintaining each. (A sample of the data elements in FMSWIN is included in Appendix H.) Review the number of times per month data elements are referenced or used. Eliminate unused or unnecessary data fields to reduce the amount of data in the system. Establish data stewardship for each of the modules.

♦ Evaluate the accuracy of all data elements currently maintained in FMSWIN and the associated subsystems and ensure that all data, including information on recent projects and repairs, have been entered into the system.

♦ Consider establishing a solicitation status telephone-answering system at the MFO and FSOs. One of the major time-consuming activities in the offices is answering questions about solicitations that are on the street. An automated 800 system could free a significant portion of staff time for more productive activities.

Because of the history of the FMS not supporting the functional needs of the users, we strongly recommend that any process action teams that are formed to work on Facilities information system initiatives be chaired by an experienced user from the program staff rather than by an information systems specialist.

Longer Term Strategy

While the near-term actions we recommend will do much, at a relatively small cost, to enhance Facilities productivity, we believe that, in the longer term, the Facilities organization should replace the FMS. The new system should be designed to take full advantage of advances in information technology. Exactly which information technologies will best meet USPS needs is difficult to predict, because changes are occurring so rapidly. We can, however, look at what is available in the market today and identify the technologies that are most likely to be applicable to the Facilities workplace. We can also suggest some steps that Facilities should take now to ensure that it is in a position to apply those advanced technologies effectively when they are fully developed.

FUTURE TECHNOLOGIES

A number of information technologies are being developed. In this section, we briefly discuss those that the Facilities organization should watch over the next 5 to 10 years and investigate for their potential for simplifying and streamlining its operations.

Asynchronous Transfer Mode

Asynchronous transfer mode, or ATM, is designed to carry multiple types of traffic simultaneously—voice, data, and video. Based on international standards, ATM will allow seamless integration of networks throughout the world, while reducing support and operation costs. ATM is applicable from inside workstations, through LANs and WANS, both public and private. This technology offers considerable benefits in terms of communication speeds since ATM link-speeds can be scaled from megabits through gigabits. Important milestones in the development of ATM include the following:

- Robust protocol standards are adopted and stabilized—1997

- The price per ATM port reaches an acceptable level (about $500)—1998

- Eighty percent of intelligent hubs integrate ATM—2005.

Distributed Application Architectures

In a system with a distributed architecture, the computational and data requirements of an application are performed by two or more computer systems. Examples are client–server, peer-to-peer, and other cooperative processing architectures. FMSWIN processing speed and reliability could be increased using this technology. Important milestones in the development of distributed application architectures include the following:

- Object-oriented development achieves sufficient maturity to be the basis for server process development—1998

- Heterogeneous distributed computing is supported directly by standard operating systems—2000

- Network bandwidth and reliability and data compression achieve performance levels that can support real-time, high-traffic communication among nodes in a WAN—2000

- Eighty-five percent of new custom applications are developed in a distributed architecture—2001.

Distributed Relational Databases

A distributed relational database is one in which the data comprising a single database reside on multiple machines that are interrelated (in contrast to a partitioned database in which the database components exist independently of each other). As with distributed application architectures, the use of distributed relational databases can increase speed and reliability, both areas of concern about FMSWIN. Important milestones in the development of distributed relational databases include the following:

♦ WAN bandwidth and reliability achieve performance levels supporting transparent, localized access to centralized databases—2000

♦ Seventy percent of new relational databases are distributed—2000

♦ Database engines achieve transaction-processing and decision-support performance levels that support centralized database management with high-traffic concurrent access—2001

♦ Middle enabling data integrity via tools, methodologies, and security facilities allow transparent implementation—2002.

Dataconferencing

Dataconferencing, also called application sharing, lets users in different locations work together on the same applications, with shared control and editing capabilities. It is not necessary that each party have the application. When used in conjunction with desktop videoconferencing, users would be able to see, talk, and work with each other without being in the same room. One possible scenario would be the simultaneous review and editing of architectural drawings from remote sites. Important milestones in the development of dataconferencing include the following:

♦ Dataconferencing based on Databeam's T.120 standard is available as a utility from Apple and Microsoft—1997

♦ Dataconferencing is integrated into new operation-system releases—1998

♦ Ninety percent of desktop computers have dataconferencing functions—2001.

Desktop Videoconferencing

Desktop videoconferencing provides real-time or near real-time video and audio links between two or more users in different locations. In many cases, desktop systems will also communicate with room-based, roll-about, or consumer telephone videoconferencing systems. Desktop videoconferencing could be used, for example, by an organization's help desk to provide system users with direct as-

sistance. It could also be used in conjunction with dataconferencing. Important milestones in the development of desktop videoconferencing include the following:

♦ ISDN line costs continue to drop and become affordable to the individual or business—1998

♦ Videoconferencing hardware and software are standard on new PCs—1999

♦ The fundamental network infrastructure is enabled at no extra cost—2000

♦ Sixty percent of desktop PCs can be used for videoconferencing—2001.

Intranet

Intranet has been defined as a network connecting a related set of clients using standard Internet protocols, especially, TCP/IP and http. Generally, that related set of clients comprises individuals within a defined organization. The Intranet takes the World Wide Web model, which allows companies to communicate with the marketplace via the Internet, and adapts it to the specific boundaries of an organization so that certain information is accessible only to its employees, and not to the Internet public. An Intranet allows an organization to share internal information with its employees using any Web browser on any computer platform. The USPS could use the Intranet as a method for exchanging information across the world in a platform-independent environment. Important milestones in the development of the Intranet include the following:

♦ Development tools, methodologies, and security facilities allow transparent implementation—1997

♦ Implementation and development standards (HTML 3.0, Java, etc.) become stable and are accepted by all major HTML servers and browsers—1998

♦ LAN and WAN bandwidth and reliability achieve performance levels supporting transparent localized access to decentralized information—2000

♦ Eighty percent of companies use Intranet for internal business activities—2000.

Massively Parallel Processing

Massively parallel processing (MPP) systems have an inherently scalable number of processors. They should be able to scale well beyond 64 processors; symmetric multiprocessors with only a few processors (16 or 32) are not included. As databases grow larger, MPP can be critical for obtaining answers quickly when hundreds of thousands, or even millions, of records are being queried. This

technology would be used at USPS where large quantities of data are maintained, complex calculations are required, or a large number of users access the system simultaneously. Important milestones in the development of MPP include the following:

♦ Diverse approaches to parallel processing converge to a few accepted methods—1998

♦ Parallel application development tools mature—2001

♦ Parallel operating systems and middleware mature—2001

♦ Seventy-five percent of new large computer systems use MPP—2005.

NEXT STEPS

To ensure that it is in a position to apply future technologies effectively, the Facilities organization should immediately initiate a number of actions:

♦ Make a management commitment to use information technology to enhance resource planning, project execution, and facilities management. Prepare a multiyear business plan for the Facilities information management system. This plan should frame the objectives, define the business principles, and be the road map for the integration of the information system into Facilities business processes. It will be a living document that is refined over time just as the schedule for a construction project is continually adjusted. Develop the plan with the participation of the MFO/FSO managers to earn their understanding of and support for the program.

♦ Initiate a detailed review of all Facilities business processes (see Appendix A for a list of the principal ones) with an eye toward streamlining and simplifying them as well as integrating electronic technology to the maximum extent practicable. Appendix K shows, for each Facilities business process, the types of information technology that could be used.

♦ Fully evaluate COTS software to determine if it could be used to meet process requirements. Computer-assisted facility management (CAFM) programs now on the market are being used by major national companies such as American Express and Bank One to track and manage their facilities and real estate assets around the nation. (See Appendix D.)

♦ Review the current system architecture relative to its lack of redundancy.

♦ If the central database does not achieve acceptable performance over the next 12 months, evaluate going to a decentralized strategy with each FSO as the host for its respective geographic area.

♦ Implement EDI technology in the requisition and payment process, and require the A-E or construction manager to submit pay requests electroni-

cally. Implement EFT for construction and real estate contract payments. Make EFT a requirement for all new real estate and construction contracts.

♦ Coordinate the development of EDI for material acquisition through the initiative currently under way in the purchasing organization of the USPS. Set up a mechanism for charging materials and products that are purchased on the national accounts to the specific construction job accounts.

♦ Implement routing capabilities in the system, similar to Lotus Notes, for various approvals and other standard processes.

♦ Initiate a continuous benchmarking program using data elements and measurements from the information system.

♦ Initiate a program for storing and retrieving all contract documents and related documents electronically. This archival/document-retrieval system would free significant portions of floor space for other uses and would also make finding documents much faster. Since the recent trend has been toward requiring construction plans to be prepared using AutoCad, it is a natural progression to store the drawings, contracts, change orders, and other key contract correspondence electronically. Lease and tax payments would also be much easier to track if the information were available electronically.

These actions will bear fruit at different stages over the next five years, giving Facilities managers and staff the management tools they need to streamline and simplify their tasks. Ultimately, by implementing these actions, Facilities will be well positioned to integrate the future technologies that will enable it to conduct its business as efficiently and cost-effectively as possible, as well as to make continual improvements in its business practices.

Appendix A
FACILITIES BUSINESS PROCESSES

Management

> Budget preparation
>
> Congressional inquiries
>
> Public hearings
>
> Asset development
>
> Project status
>
> Board of Governors presentations
>
> Technical support to divisions

Planning

> Decision Analysis Report preparation
>
> Develop customer requirements
>
> Fixed mechanization
>
> Operating system layout preparation
>
> Cost estimating
>
> Facility planning concept (929/919)
>
> Site selection
>
> Site evaluation
>
> Public correspondence
>
> Public hearings
>
> Environmental assessment

Real Estate

Appraisals

New-lease negotiation

Subleasing

Site advertisement

Site acquisition

Expiring lease negotiation

Outleasing

Relocation

Contract for real estate services

Ground leasing

Acquisition of existing buildings

Change of owners

Design

A-E solicitation

A-E selection

Cost estimating

Historic structures

Contract award

Project review with customers

Design reviews

A-E payment

Standard plans

Design/build

Site adaptation

Site utilization drawings

Construction

New construction leased

New construction owned

Design/build

Construction management

Contract negotiations

Cost estimating

Solicitation for construction

Contract award

Project review with customers

Project closeout

Contractor payment

Purchasing

Claims/appeals management

Contractor default

Operation and Maintenance

Property management

Tax program

Boiler/elevator inspection

Lessor maintenance

Energy management

Tax payment

Warranty inspections

Building inspections

Postoccupancy evaluation

Repair and Alteration

Leasehold improvements

Disposal

Property disposal

Lease termination

Appendix B
SUPPORT TEAM MEMBERS AND INTERVIEWEES

Table B-1. Support Team Members

Name	Position	Location
Lou Norris (team leader)	Manager	Windsor
Sam Barnes	Information Systems Coordinator	Dallas
D'Wayne Bradford	Architect-Engineer	Dallas
David Christensen	Postal Operations Analyst	Memphis
Jack Davidson	Manager, Real Estate	San Bruno
Donna DeMaio	Facilities Contract Technician	Windsor
James Doumit	Real Estate Specialist	Kansas City
Opal Elder	Real Estate Specialist	Greensboro
Rita Williams	Procurement Specialist	Memphis

Note: The Support Team was formed at the request of the Logistics Management Institute to review findings and provide input to be certain that information describing existing systems is accurate.

Table B-2. Interviewees

Position	Name	Location
Vice President	Rudy Umscheid	Headquarters
Manager	Les Anthony Diane Van Loozen Ed Maxwell	Headquarters Headquarters Headquarters
Managers, Major Facilities Office (MFO) or Facility Service Office (FSO)	George Overby Keith LaShier Phil Ferrari Lou Norris Bruce Bland	Dallas FSO Denver FSO Memphis MFO Windsor FSO Atlanta FSO
Manager, Administrative Services	Paul Larson	Anchorage District Office
Construction Manager	Bill Usher	Headquarters
Manager, Requirements and Planning	Dennis Smith	Memphis MFO
Manager, Real Estate	Mike Kunstadt Cheryl Hamilton Brian Pease	Headquarters Denver FSO Memphis MFO
Team Leader	Jerry Goddard Mike Goodwin Art Strange Craig Auth Larry Andrews David Bright	Atlanta FSO Denver FSO Denver FSO Denver FSO Dallas FSO Dallas FSO
Postal Operations Analyst	Dave Christensen Guido Guidi Pat Komeshak	Memphis MFO Denver FSO Dallas FSO
Facilities Program Analyst	Christy Hertz Suzanne Pinkston Ed Rynne Susan Schaeffer	Headquarters Headquarters Headquarters Headquarters
Information Systems Specialist	Tim Perez Sam Barnes Norm Fortier Isabell Santistevan	Atlanta FSO Dallas FSO Memphis MFO Denver FSO
Real Estate Specialist	Mike Wolfe Peter Arend Peter Sorrentino Richard Drury Jody Sloane Mary Presnell Jim Slayton Marilyn Nemeth Glen Ackerman	Headquarters Headquarters Headquarters Dallas FSO Atlanta FSO Atlanta FSO Dallas FSO Memphis MFO Denver FSO
Facilities Contract Specialist	Lisa Salas Shirley DeVane	Dallas FSO Atlanta FSO

Position	Name	Location
Architect-Engineer	Warren Walker Tony Regojo Bob Paetzold D'Wayne Bradford Shu Chan	Headquarters Headquarters Headquarters Dallas FSO New York District
Purchasing Specialist	Bob Fraga Herb Sartain Donna Duval	Headquarters Memphis MFO Atlanta FSO
PCES (Special Assignment)	Tom Blanchard	Headquarters
Facility Contract Technician	Cindi Grantham Carol Gleaton Sherri Weiss Pat Ward	Atlanta FSO Atlanta FSO Atlanta FSO Atlanta FSO
Budget	Kathy Banks Peg Weir Barbara Melanson	Headquarters Headquarters Windsor
General Engineer	Dave Murphy	Dallas Area Office
Secretary	Leslie Martin	Atlanta FSO
	Joe Zepeda Lou Deitch Luther Blade Don Manley John Williams Ken Skillum	Headquarters Headquarters Atlanta District Office Atlanta District Office Atlanta District Office Atlanta District Office
Business Systems Manager	Lesia Zipfel	St. Louis
Accounting/Finance	Mark Carrol Brian Ledford	St. Louis St. Louis

Appendix C
RESOURCES

Project status report

Project status report summary

Major Facilities Office (MFO) budget by accounting period

Standard project milestone schedule

Workload resources

Project budget report (MFO) (job status report, financial report, change closeout status, request for proposal log)

Projected income and expenses of a U.S. Postal Service facility

Direct capitalization model

Tax analysis spreadsheet

Tax data

Design/build solicitation (air mail facility)—prospectus and proposal information

New construction (owned) solicitation for processing and distribution center—proposal information

Architect-engineer (A-E) offer and award package

FMSWIN training manual

FMS+ manuals

Facility Service Office performance goals

Facility construction historical cost data reports (store projects, kit-of-parts projects, custom-designed facilities, design/build facilities)

Report on recommended target cost of construction

Workload analysis report

Expiring lease data report

FY96 workload report—lease information

Office workload analysis (real estate and A-E)

MapInfo literature

Design guidelines

Facility project procedures

Space requirements handbook (AS-504)

Appendix D
COMMERCIAL OFF-THE-SHELF SOFTWARE

Over the last five years, commercial off-the-shelf (COTS) software has become an integral component in the successful management of facility and project tracking within many companies. Purchasing COTS software versus "redesigning the wheel" by designing a system for proprietary use offers numerous benefits. Companies developing their own software often spend millions of dollars to design and build the system. Before a new, proprietary computer system can be implemented, business practices must be analyzed, users' needs must be determined, and finally, the program has to be written. Moreover, after the new system is implemented, problems often remain to be solved. Problems may be caused by programming errors, an improper understanding of business procedures, or even users' reluctance to move to the new software because of high learning curves. Once the proprietary system is fully implemented, however, users have access to a system that has been specifically designed for the company's current operating procedures. Productivity is enhanced as users perform the same tasks previously done manually but are assisted by a tailored computer system.

While proprietary software has a number of benefits, COTS packages have recently begun to offer a flexibility that provides companies with an alternative to designing customized software. Information needs can be specified within many COTS packages to provide just the information necessary rather than burdening companies with an information overload. COTS packages can be altered through scripting and report customization to suit the business environment in which they are to be implemented. Many companies are forgoing the costs of designing their own systems in favor of purchasing a COTS package they can customize to their requirements.

We will look at two types of COTS packages in this appendix: project management software and computer-assisted/computer-integrated facility management (CAFM/CIFM) software.

Project Management Software

Project management software assists managers in organizing project work plans by providing Gantt charts, PERT charts, and project timelines to give a visual image of project workflow. Just a few years ago, project management software was used by just a few specialists. Advances in technology and ease of use, however,

have spread the user base to project managers and staff members alike. As interest in project management software has grown, vendors have added more features and capabilities to the software to better compete in a growing market.

Table D-1 lists four desktop-oriented project management software packages on the market as of January 1995 and shows how they were rated by the *Software Digest Ratings Report:*

- ◆ *Performance* was measured on the basis of how long the user had to wait to perform the next task. All software rated changed screens within a second or two, well within acceptable bounds. Project Scheduler 6, however, had longer delays when printing reports and graphs than did the other three packages.

- ◆ *Quality* was measured on the basis of the caliber of charts generated and of schedule recalculation. Charts were considered to be of high quality if they contained information that was concise and easy to read. Schedule recalculation capabilities received high ratings if the program sought the optimal schedule to accommodate changes in resource availability.

- ◆ *Versatility* was measured according to the following criteria:

  - ◆ *Scheduling.* How complete were the tools for setting timelines, scheduling tasks, and establishing durations.

  - ◆ *Tracking and reporting.* How well did the program encourage and assist the user in entering project progress data.

  - ◆ *Resource management.* How well did the program assist in assigning project resources to projects.

  - ◆ *Work group/enterprise functions.* How well did the product meet the needs of work group functions. Needs included database accessibility, ability to establish central resource pools from which resources could be assigned, and the ability to coordinate actions from within a work group.

- ◆ *Ease of learning* was measured in terms of the project's ability to get up and running with the software product and included the capabilities for implementing tutorials, anticipating needs, and providing on-line help.

- ◆ *Ease of use* was measured according to how well the program assisted the user in completing projects once the program was mastered. Other items such as well-designed data-entry forms and the quality of the interface also were measured.

Table D-1. Comparison of Project Management Software

Product	Performance	Quality	Versatility	Ease of learning	Ease of use
Microsoft Project 4.0 for Windows	Good	Average	Good	Good	Good
Project Scheduler 6 for Windows	Average	Good	Good	Good	Good
CA-Super-Project 3.0 for Windows	Good	Good	Good	Average	Average
Time Line 6.1 for Windows	Poor	Average	Good	Average	Good

Source: "Project Management Software," *Software Digest Ratings Report,* January 1995.

Of the software packages it rated, *Software Digest* found Microsoft Project 4.0 for Windows and Project Scheduler 6 for Windows to be the best overall. Table D-2 summarizes their strengths and limitations.

Table D-3 lists three additional project management software packages. Sure Trak was introduced about the time that the *Software Digest Ratings Report* was issued and is a simplified version of Primavera Project Planner. Both Open Plan Professional and Primavera Project Planner are heavy-duty programs that are used in the construction industry but are more sophisticated than the performance level needed for most USPS contract management. We rated them using the same rating scheme used by *Software Digest.*

CAFM/CIFM Software

New technologies such as enterprise-wide data connectivity and client–server architecture are driving businesses to organize and access information of critical importance for a wide range of business situations. CAFM/CIFM packages now are being designed for use in such a distributed system to help in managing various assets such as furniture and equipment and to assist with facility space usage, building maintenance, and real property management. As this niche market grows, many companies are turning to COTS software to provide the functionality provided by proprietary systems.

Table D-2. Comparison of Microsoft Project 4.0 and Project Scheduler 6

Microsoft Project 4.0 for Windows		Project Scheduler 6 for Windows	
Strengths	Limitations	Strengths	Limitations
Allows user to force chart to fit single page	Cannot display earned value as a graph	Offers sophisticated resource leveling	Has no OLE support
Offers calendar report format	Offers no option to split tasks	Allows user to assign calendar by activities	Has no macro learn mode
Offers calendar view by resource	Uses simplistic re-source leveling algo-rithm	Offers unlimited levels of undo	Has no macro debug-ging tools
Allows user to cus-tomize toolbar		Offers recurring task entry	Does not allow user to select and mix fonts in PERT charts
Has OLE support (client–server)		Allows free-floating text and graphics on charts	
Allows free-floating text and graphics on charts		Allows user to force chart to fit page	
Offers recurring task entry		Provides ODBC sup-port	
Includes a macro learn mode		Allows user to enter best/worst/most likely estimates	
Allows user to request and gather commit-ments		Allows user to display earned value as a graph	
Allows user to request and gather updates			
Is easiest program to learn and use			

Table D-3. Comparison of Project Management Software

Product	Performance	Quality	Versatility	Ease of learning	Ease of use
Primavera Sure Trak Project	Good	Good	Good	Good	Average to good
Open Plan Professional	Good	Excellent	Excellent	Average	Good
Primavera Project Planner	Good	Excellent	Excellent	Average	Average

Table D-4 lists some of the major competitors in the CAFM market and shows which of the following core functions are supported by each company's package:

♦ *Accounting.* Does the package support accounts payable/receivable in addition to other budgetary considerations?

♦ *Asset management.* Does the package provide inventory tracking capabilities of various assets such as properties, furniture, and equipment? Is depreciation calculation supported?

♦ *CAD.* Does the package contain an integrated CAD package or will it seamlessly meld with available CAD packages?

♦ *Facilities management.* Does the package assist in facility tracking and reporting?

♦ *Maintenance management.* Does the package provide the capability to do failure or replacement analysis of facility inventory? Is preventive maintenance reporting supported?

♦ *Project management.* Is the capability to effectively manage project scheduling/reporting available?

♦ *Property management.* Is real property management such as property leasing supported?

Table D-4. Functional Capabilities of CAFM Software, by Company

Company	Acctng.	Asset mgt.	CAD	Fac. mgt.	Maint. mgt.	Proj. mgt.	Prop. mgt.
Access Control Technologies		X					
Accugraph		X		X			X
AMSI	X	X			X		X
Archibus, Inc.		X	X	X	X		X
Autodesk			X	X			
Data One, Inc.		X	X	X			
Facility Management Systems		X		X	X		
FM Systems		X		X			X
Graphic Data Systems Corp.		X	X	X			X
Innovative Tech Systems		X		X	X		X
Isicad		X	X	X			
Kelly International Security		X		X			X
Microwest Software Systems, Inc.		X		X	X	X	
SoftDesk, Inc.		X	X	X	X	X	X
Tera Control Systems, Inc.		X		X			
The Softa Group, Inc.		X					
Vertex Industries, Inc.		X					

Source: Building Operating Management: Buyers Guide Issue, June 1995.

Of the CAFM/CIFM packages, that developed by Archibus, Inc.—
Archibus/FM—has much of the functionality found in FMSWIN's software and is
in wide use throughout the facilities business. For example, Archibus/FM is cur-
rently being used by American Express and Bank One to track facilities through-
out the nation. A 1995 survey done by the National Association of Corporate
Real Estate Executives found that 66 percent of businesses using a COTS
CAFM/CIFM package are currently using Archibus/FM. The software company
has been in business for nearly a decade and is one of the industry leaders in asset
management.

Archibus/FM features a modular design that allows organizations to purchase only
the modules necessary to meet specific needs. Currently Archibus/FM has the
following modules:

- Space management module
  - Track square footage
  - Create space-utilization reports
- Furniture and equipment management module
- Design management (CAD) module
- Building operations management module
  - Manage work orders on facility assets
  - Track asset maintenance
  - Create preventive maintenance reports
- Facilities information management module (core module).

In July 1996, Archibus, Inc., plans to release an upgrade that offers these addi-
tional modules:

- Real property and lease management module
  - Track leases and options
  - Manage and analyze leases
  - Track owned or occupied buildings
  - Link CAD drawings to leased space to aid in charge back
- Telecommunications and cable management module.

Archibus/FM is a complete client–server package that provides access to the na-
tive Watcom SQL 4.0 database supplied with the software or Oracle 7.0 for enter-
prise-wide applications. The software is designed to easily accommodate
modifications to business data requirements through its implementation of a sim-
ple scripting language. Data screens and reports can be customized on a user ba-

sis to display only that information pertinent to that user. In addition, the system has been designed to allow for field-level security to limit access to restricted data. The package has been designed to allow users to get up and running with the software with two to three hours of training. Advanced training allows users to learn how to use the scripting tools to customize the software. If the U.S. Postal Service's Facilities organization chooses to evaluate a COTS CAFM package that would best suit its needs, Archibus/FM would be the place to start.

Appendix E
TYPICAL SYSTEM HARDWARE

Hardware	Headquarters	Major Facilities Office and Facility Service Offices	District offices
Server	Novell Netframe	Novell Netframe	Dell or Digital PC
Software	Novell 3.12 or 4.11	Novell 3.12 or 4.11	Novell 3.12 or 4.11
Configuration	Standard	Standard	Standard
Specification	486/33	486/33	486/33
RAM	128 MB	64 MB	64 MB
Hard drive	20 GB	8 GB	8 GB
Application server	Pentium	Pentium	Pentium
Personal computer	IBM-compatible desktop	IBM-compatible desktop/laptop	IBM-compatible desktop/laptop
Operating system	Win 3.1; Win 95	Win 3.1; Win 95	Win 3.1; Win 95
Specification	486	486/Pentium	486
RAM	8 MB	16 MB	16 MB
Hard drive	120 MB	120 MB	120 MB
Computer-aided drafting and design	AutoCad	AutoCad[a]	None
Juke box	None	One per office	None

[a]One CAD workstation with the AutoCad program is being installed in each office during this fiscal year.

Appendix F
Workflow Diagrams

A-E Selection and Design Process (Conventional)

```
   ┌─────────┐      ┌──────────────┐     ┌──────────────┐      ◇          ┌──────────────┐
   │ Project │      │Cross-functional│   │Set milestones│   Delivery      │ Design/build │
   │ approval│─────▶│team assigned │───▶│              │──◇method?◇─────▶│   process    │
   │ rec'd(form)│   └──────────────┘    └──────────────┘     ◇            └──────────────┘
   │  4209)  │                                               
   └─────────┘          Conventional design process

   ┌──────────────┐    ┌──────────────┐    ┌──────────────┐              ┌──────────────┐
   │ Advertise for│    │ A-E selection│    │  Prenegotiate│              │ MSBD process │
   │design contract│──▶│              │───▶│with short list│             │              │
   └──────────────┘    └──────────────┘    └──────────────┘              └──────────────┘

   ┌──────────────┐      ◇           ┌──────────────┐   ┌──────────────┐  ┌──────────────┐
   │ Negotiate w/ top│  Agree to  Yes│ Award design │   │Commit design │  │  Hard and    │
   │  selection   │──◇ A-E fee? ◇───▶│  contract    │──▶│contract with │─▶│electronic copy│
   └──────────────┘      ◇            └──────────────┘   │  form 4211   │  │of 4211 sent to│
                      No                                 └──────────────┘  │ St. Louis PDC │
                                                                           └──────────────┘
   ┌──────────────┐    ┌──────────────┐      ◇          ┌──────────────┐  ┌──────────────┐
   │  CS issues   │    │  Concept     │  Total project No│Return project│  │Data processor│
   │  notice to   │───▶│10% and 30%   │──◇ funding ◇────▶│to district for│ │verifies/enters│
   │  proceed     │    │design reviews│   approval?       │  rework     │  │information into│
   └──────────────┘    └──────────────┘      ◇           └──────────────┘  │   system     │
                                          Yes                              └──────────────┘

                     ┌──────────────┐    ╱Contract╲        ╱Construction╲
                     │70%, 95% and  │   │ payments │      │   phase      │
                     │100% design   │──▶│ 4211A/B  │─────▶│              │
                     │  reviews     │   │(ongoing) │       ╲            ╱
                     └──────────────┘    ╲        ╱
```

Notes: Shading indicates steps that involve the use of information technology. A-E = architect-engineer, MSBD = Medium Standard Building Design, PDC = Postal Data Center, CS = contract specialist.

Solicitation Process
(Construction)

```
┌─────────┐     ┌──────────────┐     ┌──────────────┐     ┌──────────────┐     ┌──────────────┐
│ Project │     │Contract      │     │Contract      │     │   Project    │     │              │
│ approval│────▶│specialist    │────▶│specialist    │────▶│advertised for│────▶│Bid document  │
│rec'd    │     │receives RFS  │     │prepares      │     │construction  │     │clarification │
│(form    │     │from team     │     │solicitation  │     │(CBD - 30 days)│    │              │
│4209)    │     │leader        │     │(DCCS)        │     │              │     │              │
└─────────┘     └──────────────┘     └──────────────┘     └──────────────┘     └──────────────┘
```

No

```
┌──────────────┐     ┌──────────────┐     ┌──────────────┐     ┌──────────────┐     ◇
│Addendums     │     │ Contractors  │     │              │     │              │   ╱ ╲
│issued,       │◀────│ submit       │◀────│Evaluation of │◀────│Negotiate with│◀─◇Proposals◇
│if necessary  │     │ proposals    │     │offers        │     │contractor    │   ╲acceptable?╱
│(DCCS)        │     │ (hard copy)  │     │              │     │              │     ◇
└──────────────┘     └──────────────┘     └──────────────┘     └──────────────┘
```

Yes

```
┌──────────────┐     ┌──────────────┐     ┌──────────────┐     ┌──────────────┐     ┌──────────────┐
│   Award      │     │  Commit      │     │ Commit A-E   │     │ Hard and     │     │Data processor│
│construction  │────▶│construction  │────▶│contract for  │────▶│electronic    │────▶│verifies and  │
│contract      │     │contract (4211)│    │contract admin│     │copies of     │     │enters        │
│              │     │              │     │(4211)        │     │4211's sent to│     │information   │
│              │     │              │     │              │     │St. Louis PDC │     │into system   │
└──────────────┘     └──────────────┘     └──────────────┘     └──────────────┘     └──────────────┘

┌──────────────┐     ╭──────────────╮
│ CS issues    │     │Construction  │
│ notice to    │────▶│phase         │
│ proceed      │     │              │
└──────────────┘     ╰──────────────╯
```

Notes: Shading indicates steps that involve the use of information technology. RFS = request for services, DCCS = Design and Construction Contracting System, CBD = *Commerce Business Daily*, A-E = architect-engineer, PDC = Postal Data Center, CS = contract specialist.

Contract Payment Process

Contractor submits requisition using form 4211A or B	Project manager verifies requisition	Project manger gives to FCT for entry into system	FCT enters payment data into system	CO notified that approval is necessary

CO verifies and approves payment data in system	Hard copy signed by CO	CO notifies FCT approval completed	FCT completes data entry	Hard copy mailed to St. Louis PDC

St. Louis receives hard copy — No → **No action taken**

Field offices get a diagnostic report showing status of all paments, however, the report is cumbersome and not frequently used.

Yes

Data processor enters control number	**Electronic copy appears**	Yes →	Approval information is verified	Payment information entered into PACS

No

Hard copy returned to originating office		PACS generates checks in Minneapolis	Checks are released from Minneapolis	Contractor receives payment

Notes: Shading indicates steps that involve the use of information technology. FCT = facilities contract technician, CO = contracting officer, PDC = Postal Data Center, PACS = Project Authorization and Control System.

Site Acquisition Process

```
┌─────────┐      ┌──────────────┐    ┌──────────────┐    ┌──────────────┐    ┌──────────────┐
│Planning │ ───> │Identify      │──> │Collect site  │──> │Acquire       │──> │Locate flood  │
│process  │      │potential     │    │plans from    │    │comparables   │    │plain from    │
└─────────┘      │sites         │    │field         │    │from realtor, │    │topographic   │
                 └──────────────┘    └──────────────┘    │county, other │    │maps          │
                                                          └──────────────┘    └──────────────┘

┌──────────────┐  ┌──────────────┐    ┌──────────────┐         No    ◇             ┌──────────────┐
│Identify all  │  │Research site │    │Analyze       │          ◇Sites meet◇  Yes  │Select site   │
│external      │<─│history -     │<── │potential     │ <─────  ◇the need?◇  ────>  │              │
│issues        │  │neighbors,    │    │sites         │          ◇             └──────────────┘
└──────────────┘  │land records, │    └──────────────┘
                  └──────────────┘

┌──────────────┐  ┌──────────────┐    ◇Sale price◇             ┌──────────────┐    ┌──────────────┐
│Negotiate     │  │Write up terms│    ◇ fair &  ◇   Yes        │Agree to sale │    │Sign contract │
│sale price    │─>│of contract   │──> ◇reasonable?◇  ────>     │price         │──> │              │
└──────────────┘  │using RECS    │    ◇             └──────────────┘    └──────────────┘
                  └──────────────┘

                                                                                    ╭─────────╮
                                                                                    │Design   │
                                                                                    │phase    │
                                                                                    ╰─────────╯
```

Notes: Shading indicates steps that involve information technology. RECS = Real Estate Contracting System.

Appendix G
FMS+ STANDARD REPORTS

Facility Reports

Facility summary report

Facility detail report

Facility expiring lease report

Facility notes report

Project Reports

Project listing report

Project detail report

Project synopsis report

Project status report

Project milestone date summary

Project notes report

Project worksheet report

Lease Management Reports

125/125B report

Owner name query

Payee name query

Owner/payee name query

Financial Reports

Project balance report

Financial transaction report

Financial year-to-date report

Contract report

Contractor Subsystem Reports

Subcontractor log

Prime and subcontractor log by contract

Minority reports for subcontractors

Summary report (minority business procurement)

Prime contractors listing (over time period)

Minority business report (with percentage)

Management Analysis Reports

Milestone date check

Workload analysis

Ad Hoc Reports

Facility data report

Project data report

Appendix H
SAMPLE OF DATA ELEMENTS IN FMS DATABASE

Facility Information

Responsible office

Facility identification number

Budget Authority finance number

Budget Authority code

Address

Building type

Acquisition type

Land type

Facility use

Facility building areas

Building ownership

Land ownership

Type of tenants

Construction materials

Primary fuel used

Secondary fuel used

Date last painted

Type of air conditioning

Party responsible for utilities

Party responsible for maintenance

Lessor information

Payee information

Tax code

Total tax liability

Tax base amount

Tax bill amount

Date assessed

Land value

Improvement value

Total value

Lease type

Effective date of lease

Expiration date of lease

Term of lease

Annual rent

Purchase option price

Termination notice days

Lease amendments

Expiring leases

Project Information

Project number	Project manager
Project type	Funding categories
Project description	Approved funding
Program	Authorized funding
Schedule milestones (dates/status)	Committed funding
Start date	

Appendix I

TEMPLATES

Every Facilities project involves a similar set of routine, often tedious activities. For instance, most new construction projects require generating various forms and letters, such as the notice to proceed and the award letter. Recreating these forms and letters for each project is an inefficient use of time. An alternative is to use standard templates for the major forms and letters that must be generated during a typical project.[1]

Using templates has two major benefits. First, it would help to eliminate having to rewrite or construct a document each time it is needed, thereby increasing staff productivity. Second, the use of standardized wording in these forms and letters would allow the Facilities organization to define and implement its policies more easily.

The templates could be used for producing standardized documents, letters, and forms. The templates should be created from a modularized set of software applications, such as Microsoft Office Suite, currently being used by the Facilities organization. These templates could even make use of information contained in facility and project records by automatically importing relevant data into the appropriate location in the template. Users would also be able to customize the document to meet specific needs.

General procedures for using such a template follow:

- ◆ Select the type of activity, such as solicitation or award, from the template toolbar or menu within the software application.

- ◆ Select the type of form, such as *Commerce Business Daily* letter or award letter, from the toolbar or menu.

- ◆ Customize the standard template that appears on the screen by inserting facility- or project-specific information where appropriate.

- ◆ Print the document.

---

[1]The FMS+ had the capability to produce standard letters through the letter-writer function. However, that function was never fully developed to the point where it could be used by the staff. A limited number of standard documents are expected to be contained in FMSWIN.

The standard templates could be linked to the database containing all of the facility or project record information. The user could take advantage of this feature through the following procedures:

♦ Enter the facility or project identification number when prompted, thus linking the appropriate record with the template manager. The relevant information is automatically inserted into the document in the appropriate locations.

♦ Print the document.

Appendix J

EXAMPLE OF DATA IN DENVER CONSTRUCTION COST DATABASE

FACILITY CONSTRUCTION HISTORICAL COST DATA
Custom Designed Facilities
Denver Facilities Service Office

Facility Name	Award Date	Cost Index (Means)	Gross Building Size, SF	Site Size SF	Total Building Cost	Site Improv. Cost	Site Develop. Cost	Contract Mods. Amount	Contract Mods. %	Unit Cost Building $/SF	Unit Cost Site Impr. $/SF	Site Dev. $/SF	Total Project $/SF	Remarks
Denver, CO - University Park	08/29/89	89.77	29,900	174,240	$1,649,777	$309,092	$76,809	$32,131	2%	$56.25	$1.77	$0.44	$69	
Colorado Sprgs, CO - Security	08/30/89	86.63	15,500	148,120	$996,574	$193,348	$62,435	$35,261	3%	$66.57	$1.31	$0.42	$83	
Omaha, NE - AMF	09/15/89	84.98	33,122	197,122	$2,109,308	$370,519	$164,092	$120,972	5%	$67.34	$1.88	$0.83	$83	Fixed Mech. excluded.
Denver, CO - Cap. Hill Carrier	07/11/90	89.85	19,188	80,753	$1,129,462	$225,085	$34,421	$96,202	7%	$63.88	$2.79	$0.43	$77	
Albuquerque, NM - AMF	07/20/90	84.28	41,373	219,805	$2,963,235	$545,414	$43,249	$91,219	3%	$73.83	$2.48	$0.20	$88	
Denver,CO - Downtown Sta.	08/10/90	90.52	29,132	107,372	$1,929,286	$328,750	$206,929	$177,086	7%	$72.30	$3.06	$1.93	$91	
Las Vegas, NM - Red Rock	08/16/90	97.44	27,643	208,878	$2,107,557	$416,000	$170,000	$11,657	0%	$76.66	$1.99	$0.81	$98	
Aurora, CO - Main Office	09/07/90	90.52	50,839	286,146	$2,746,388	$367,527	$297,488	$217,006	6%	$58.29	$1.28	$1.04	$71	Operational Change
Edgewood, NM -	09/11/90	86.54	9,950	120,000	$736,068	$76,640	$52,625	$19,186	2%	$75.90	$0.64	$0.44	$89	
Boulder City, NV	09/17/90	98.16	16,145	107,600	$1,441,462	$216,467	$238,561	$16,490	1%	$90.30	$2.01	$2.22	$118	
Fallbrook, CA	03/26/91	108.04	20,936	151,075	$1,832,747	$344,856	$227,054	$151,812	6%	$94.79	$2.28	$1.50	$122	
Gilbert, AZ - Carrier	08/06/91	89.57	21,075	165,000	$1,078,608	$306,100	$101,900	$12,208	1%	$51.76	$1.86	$0.62	$71	
Fort Collins, CO - Main Office	08/12/91	91.91	51,669	416,980	$2,790,008	$537,687	$391,305	$265,890	7%	$59.14	$1.29	$0.94	$77	Operational Change
American Fork, UT	08/23/91	86.32	18,646	117,298	$1,047,257	$112,243	$27,000	$11,510	1%	$56.78	$0.96	$0.23	$64	
Tucson, AZ - Silverbell	08/27/91	89.98	22,663	196,891	$1,333,754	$164,000	$104,800	$34,554	2%	$60.38	$0.83	$0.53	$72	
Hesperia, CA	09/06/91	109.50	42,615	174,419	$2,691,523	$388,261	$243,298	$118,417	4%	$65.94	$2.23	$1.39	$81	
Mesa, AZ - Falcon Field	09/06/91	89.57	24,045	219,230	$1,900,830	$355,887	$69,219	$73,636	3%	$82.12	$1.62	$0.32	$100	
Casa Grande, AZ	09/12/91	89.57	22,938	208,416	$1,986,839	$123,902	$94,712	$8,453	0%	$86.99	$0.59	$0.45	$97	
Kalispell, MT	09/12/91	96.69	42,541	283,271	$2,772,955	$274,166	$171,941	$55,062	2%	$66.48	$0.97	$0.61	$77	
Littleton, CO - Highlnds.R.B.	09/12/91	91.91	51,669	409,900	$2,836,282	$462,647	$534,051	$250,110	7%	$59.73	$1.13	$1.30	$79	
Denver, CO - South Car. Annex	09/15/91	91.91	10,000	68,200	$371,911	$22,244	$49,846			$37.19	$0.33	$0.73	$44	Renovation of Exist. Qrtrs.
Lander, WY - Main Post Office	09/15/91	81.64	18,500	165,000	$1,330,874	$173,954	$238,826	$91,570	5%	$76.89	$1.05	$1.45	$99	
Las Vegas, NV - Strip Branch	09/16/91	99.13	13,900	66,002	$1,071,349	$172,600	$90,000	$18,949	1%	$78.44	$2.62	$1.36	$97	
Boise, ID - SW	09/17/91	91.00	16,767	131,996	$1,247,995	$124,806	$109,500	$60,301	4%	$78.03	$0.95	$0.83	$92	
Denver, CO - Sullivan Station	09/18/91	91.91	27,400	225,254	$1,603,699	$645,523	$314,695			$58.53	$2.87	$1.40	$94	
Meridian, ID	09/18/91	91.00	18,023	132,355	$1,158,664	$90,168	$107,000	$52,659	4%	$67.21	$0.68	$0.81	$78	
Elkhorn, Ne - MPO	10/01/91	81.44	6,797	58,363	$399,826	$88,362	$45,802			$58.82	$1.51	$0.78	$79	
Bismarck, ND - MPC/DCAP	05/18/92	83.44	66,600	235,660	$2,219,148	$265,165	$133,687	$182,502	7%	$36.06	$1.13	$0.57	$42	Renovation of Exist. Qrtrs.
Pagosa Springs, CO - MPO	05/22/92	92.98	12,550	90,430	$1,109,665	$258,425	$54,910	$20,927	1%	$90.09	$2.86	$0.61	$115	
Tempe, AZ - Carrier Annex	06/26/92	89.16	19,097	187,490	$1,058,151	$205,331	$116,507	$0		$55.41	$1.10	$0.62	$72	
Window Rock, AZ- MPO	08/06/93	92.45	13,817	125,888	$1,465,411	$253,706	$136,883	$16,759	1%	$107.27	$2.02	$1.09	$136	Navajo Nation location (remote)
Buckeye, AZ - MPO	09/18/93	92.63	12,369	99,900	$1,056,145	$118,330	$123,525	$45,010	3%	$89.03	$1.18	$1.24	$109	Final mod outstanding
Peoria, AZ - Carrier Annex	09/19/93	92.63	27,396	253,205	$1,861,463	$99,045	$349,492	$31,912	1%	$69.11	$0.39	$1.38	$85	Final mod outstanding
Bismarck, ND - Car. Parking	08/24/94	88.44	18,720	18,720	$604,547	$81,572	$29,281	$19,244	3%	$33.32	$4.36	$1.56	$39	Unsuitable Soils Exc. Required.
Chandler, AZ - Chaparral (P.S.)	09/15/94	95.25	25,411	271,250	$2,069,500	$270,000	$270,000	$176,313	7%	$88.38	$1.00	$1.00	$110	Custom revised to include store
Glendale, AZ - Greenway(P.S.)	09/15/94	95.25	32,700	246,425	$2,217,150	$246,425	$246,425	$47,587	2%	$69.26	$1.00	$1.00	$84	Custom revised to include store
Sutton, AK- MPO	08/24/94	135.82	1,780	53,140	$305,298	$83,869	$45,447	$25,746	6%	$185.98	$1.58	$0.86	$259	Site is not paved
Unalaska,AK Dutch Harbor St	05/18/94	134.52	14,200	87,661	$2,346,662	$121,745	$112,724	$60,982	2%	$169.55	$1.39	$1.29	$186	36k sf site devel.& 7k sf is WH
Belen, NM - MPO	03/28/94	96.70	14,340	108,760	$1,650,538	$122,194	$292,681	$231,864	11%	$131.27	$1.12	$2.69	$160	Extensive Site Clean-up req'd.
Average			854,805	5,764,079	53,662,310	8,614,006	5,132,716	2,319,451		$76	$1.49	$0.89	$96	

Bldg. cost/sf includes contract modification amounts.

(P.S.) - Postal Store included in the facility.
US POSTAL SERVICE CONFIDENTIAL

FACILITY CONSTRUCTION COST DATA
Design/Build Projects
Denver Facilities Service Office

Facility Name	Award Date	Cost Index (Means)	Gross Building Size, SF	Site Size SF	Total Building Cost	Site Improv. Cost	Site Develop. Cost	Contract Mods. Amount	Contract Mods. %	Unit Cost Building $/SF	Unit Cost Site Impr. $/SF	Unit Cost Site Dev. $/SF	Total Project $/SF	Remarks
Boulder, CO - Valmont Station	09/05/91	91.91	37,500	209,088	$1,542,517	$278,855	$223,633	$190,170	9%	$46.20	$1.33	$1.07	$60	Design-build Renovation
Huron, SD - MPC/DCAP	05/15/92	81.03	67,790	304,906	$2,136,082	$431,464	$229,821	$42,509	2%	$32.14	$1.42	$0.75	$42	
Grand Forks, ND-MPC/DCAP	05/19/92	83.44	70,486	299,940	$2,605,195	$501,652	$86,665	$82,861	3%	$38.14	$1.67	$0.29	$46	Size excludes 14,472 SF Car pkg.
North Platte, NE-MPC/DCAP	05/19/92	87.76	74,950	260,793	$2,165,635	$304,078	$195,287	$54,429	2%	$29.62	$1.17	$0.75	$36	Size excludes 12,000 SF Car pkg.
Casper, WY- MPO (P.S.)	06/21/94	86.56	59,598	367,210	$2,922,800	$464,134	$678,725	$48,804	1%	$49.86	$1.28	$1.85	$69	Includes Postal Store
Bountiful, UT - MPO (P.S.)	06/14/94	91.43	25,440	117,000	$1,691,000	$273,000	$140,000	$29,392	1%	$67.63	$2.33	$1.20	$84	Boom market & cov'd carrier
Layton, UT - MPO (P.S.)	09/15/94	91.69	28,140	213,444	$2,025,500	$132,500	$325,000	$147,203	6%	$77.21	$0.62	$1.52	$93	Boom market & cov'd carrier
Avon, CO - MPO (P.S.)	09/15/94	97.48	18,532	111,514	$2,545,951	$375,670	$233,442	$57,196	2%	$140.47	$3.37	$2.09	$173	Boom market resort town
Jackson, WY - MPO (P.S.)	09/15/94	97.48	26,800	152,000	$3,225,000	$475,123	$366,790	$0		$120.34	$2.51	$2.17	$152	Boom market & resort town
Columb. Falls MT MPO (P.S.)	09/21/94	102.36	15,450	84,250	$1,292,190	$77,780	$113,530	$59,042	4%	$87.46	$0.92	$1.35	$100	Heavy construction demand
Havre, MT MPO (P.S.)	09/21/94	102.36	23,928	90,000	$1,541,855	$216,690	$158,235	$23,528	1%	$65.42	$2.41	$1.76	$81	Active construction market
Cedar City, UT-MPO (P.S.)	09/07/94	91.69	25,571	126,886	$1,766,195	$125,926	$154,679	$167,445	8%	$75.62	$0.99	$1.22	$87	Includes Postal Store.
Sandy, UT - Alt.Can.(P.S.)	05/19/95	91.43	22,128	171,000	$1,671,639	$272,953	$172,905			$75.54	$1.60	$1.01	$96	Boom market & cov'd carrier
Issaquah, WA - MPO (P.S.)	1/10/96	114.8	27,007	165,000	$2,509,938	$331,574	$550,732			$92.94	$2.01	$3.34	$126	Site Surcharge & Traffic signals.
Albq., NM - Pino Sta. (P.S.)	09/27/95	98.20	38,411	166,198	$2,806,202	$349,404	$140,483			$73.06	$2.10	$0.85	$86	
Average			335,764	1,558,937	13,063,229	2,253,183	1,554,131	448,164	3.56%	$71.44	$1.45	$1.00	$88.69	

Bldg. cost/sf includes contract modification amounts.

(P.S.) - Facility Includes Postal Store.
US POSTAL SERVICE CONFIDENTIAL

Appendix K
POTENTIAL USES OF INFORMATION TECHNOLOGY

Facilities business process	EDI	EFT	Template	GIS	Teleconferencing	Database	Remote access	CAD
Management								
Budget preparation			X		X	X		
Congressional inquiries			X		X			
Public hearings			X	X	X			
Asset development			X	X	X	X		
Project status			X		X	X	X	
Board of Governors presentations			X		X			
Technical support to divisions			X		X			
Planning								
DAR preparation			X	X	X	X		X
Develop customer requirements			X	X	X			X
Fixed mechanization			X			X		X
Operating system layout preparation			X			X		X
Cost estimating			X			X		X
Facility planning concept (929/919)			X					
Site selection			X	X			X	
Site evaluation			X	X			X	
Public correspondence			X	X	X			
Public hearings			X	X	X			
Environmental assessment			X	X			X	
Real estate								
Appraisals			X	X		X	X	
New-lease negotiation			X		X	X	X	
Subleasing			X		X	X	X	
Site advertisement			X	X				
Site acquisition			X	X		X	X	
Expiring-lease negotiation			X		X	X	X	
Outleasing			X		X	X	X	
Relocation			X				X	
Contract for real estate services			X				X	
Ground leasing			X	X		X	X	

Facilities business process	EDI	EFT	Template	GIS	Teleconferencing	Database	Remote access	CAD
Acquisition of existing buildings			X			X	X	
Change of owners			X					
Design								
A-E solicitation			X					
A-E selection			X			X		
Cost estimating			X	X		X		
Historic structures			X			X		
Contract award			X			X		
Project review with customers			X		X			
Design reviews			X		X			X
A-E payment	X	X	X					
Standard plans			X					X
Design/build			X					X
Site adaptation			X	X				X
Site utilization drawings			X	X				X
Construction								
New construction leased			X					X
New construction owned			X					X
Design/build			X					X
Construction management			X				X	X
Contract negotiations			X				X	
Cost estimating			X			X		
Solicitation for construction			X					
Contract award			X					
Project review with customers			X		X		X	
Project closeout								
Contractor payment	X	X	X				X	
Purchasing	X	X	X			X		
Claims/appeals management			X					
Contractor default			X					
Operation and maintenance								
Property management			X	X		X		
Tax program			X	X		X		
Boiler/elevator inspection			X				X	X
Lessor maintenance			X					
Energy management			X	X		X		
Tax payment			X			X		
Warranty inspections			X				X	X

Facilities business process	EDI	EFT	Tem- plate	GIS	Telecon- ferencing	Database	Remote access	CAD
Building inspections			X				X	X
Post occupancy evaluation			X			X	X	X
Repair and alteration								
Leasehold improvements			X			X		X
Disposal								
Property disposal			X					
Lease termination			X					

Notes: EDI = electronic data interchange; EFT = electronic funds transfer, GIS =geographic information system; CAD = com- puter-aided design; DAR = Decision Analysis Report, and A-E = architect-engineer.

Appendix L
GLOSSARY

A-E	architect-engineer
ATM	asynchronous transfer mode
CAD	computer-aided design
CADD	computer-aided design and drafting
CAFM	computer-assisted facility management
CAM	computer-aided manufacturing
CBD	*Commerce Business Daily*
CIFM	computer-integrated facility management
COTS	commercial off-the-shelf
CPM	critical path method
DAR	Decision Analysis Report
DBMS	database management system
DCCS	Design and Construction Contracting System
DGS	Document Generating System
EDI	electronic data interchange
EFT	electronic funds transfer
FCT	facilities contract technician
FMS	Facilities Management System
FPC	Facility Planning Concept
FSO	Facility Service Office
GIS	geographical information system
HVAC	heating, ventilation, and air conditioning
IQC	indefinite quantity contract
ISC	information system coordinator
ISSC	Information Systems Service Center

LAN	local area network
MFO	Major Facilities Office
MPP	massively parallel processing
MSBD	Medium Standard Building Design
NIPS	National Military Command System Support Center Information Processing System
PACS	Project Authorization and Control System
PDC	Postal Data Center
PRN	Postal Routed Network
PSI	PSI Systems, Inc.
R&A	repair and alteration
RECS	Real Estate Contracting System
SSBD	Small Standard Building Design
USPS	U.S. Postal Service
WAN	wide area network

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Ensuring that the U.S. Postal Service has the right facilities at the right time and at the right price is a huge and complex job. To accomplish all of the tasks associated with that job, the USPS both uses and generates a great deal of information—about each project as well as about the entire inventory of some 35,000 USPS facilities. The need to manage that information effectively led to the development of the Facilities Management System (FMS). Over the 23 years since it was implemented, the FMS has been continually modified to accommodate expanding information requirements. This report presents the results of a study to analyze the information requirements at all levels of the Facilities organization, to assess the usefulness of the existing USPS facility management tools, and to analyze the information technology needs in the workplace. The study concluded that, at best, the FMS can be considered adequate; it tries to be all things to all people, but it does not appear to do many things very well. The report recommends several enhancements that can be accomplished in less than a year at a relatively low cost and will improve productivity in the near term. For the longer term, the report recommends that the USPS redesign its management system to take full advantage of advances in computer and telecommunications technologies.

14. SUBJECT TERMS

U.S. Postal Service, facilities management, information systems, Facility Management System, FMS, FMS+, FMSWIN, postal routed network, PRN.

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